IN THE UNITED STATES DISTRICT COURT
DISTRICT OF UTAH
NORTHERN DIVISION

Phillip M. Adams & Associates, L.L.C., a Utah Limited Liability Company Plaintiff, vs. Dell Inc., et al., Defendants.	)	Civil No. 1:05-CV-64 TS Honorable Ted Stewart Magistrate Judge David Nuffer

REPORT AND RECOMMENDATION OF SPECIAL MASTER
REGARDING CLAIM CONSTRUCTION

Plaintiff Adams contends that Defendants have infringed five of Plaintiff's U.S. patents that generally relate to the hardware and software that control the flow of data between a computer's central processing unit and a data storage medium. Defendants deny infringement and interpose various affirmative defenses. A jury is demanded.

In an Order of Reference dated November 13, 2006, the Court appointed the undersigned as Special Master (SM) pursuant to Rule 53, FRCP. The specific purpose of the reference was to have the SM "review the parties' proposed constructions for the claim terms that they have identified for interpretation and to file with the Court a report with recommended claim constructions for the identified terms." A few months later one of the attorneys for Defendants advised in a letter[1] to the SM that, owing to addition of parties and patents, and consequent pleading complications, the scheduling order then in place in this case would likely have to be

[1] Letter Briggs to Harmon, dated April 20, 2007.

substantially revised. On May 8, 2008, the Court entered a revised Scheduling Order, setting a target date for this report of October 22, 2008.

In accordance with the revised Scheduling Order, Defendants submitted their List Of Claim Terms For Construction on June 13, 2008. Also on that day, Plaintiff submitted a Notice To Defendants Regarding Claim Interpretation. Rather than listing terms proposed for construction, Plaintiff's Notice stated its position that "none of the claims of the patents-in-suit require[s] interpretation or construction." In a letter[2] to Plaintiff dated July 7, 2008, Defendants expressed various concerns regarding this strategy, and also very commendably narrowed their own list of terms proposed for construction. On July 11, as scheduled, the parties submitted their Proposed Claim Constructions and on August 11 a Joint Statement.[3] The evidence identified in the Joint Statement is largely intrinsic to the patent documents, although each side refers to some extrinsic evidence as well. The Joint Statement was disappointing in one major respect, in that the parties were unable to agree to any construction of any claim term (JS 2). This is truly unfortunate for, as will be seen, they contest more than 30 separate terms (and the SM has identified several more that require analysis), a total that is far beyond anything that the SM has ever encountered in the course of numerous claim construction exercises undertaken either as a special master or trial attorney, even in multi-patent cases. To their credit, however, the parties did agree that no expert testimony, declarations, or reports would be relied upon in the briefing or at the hearing (JS 3). Initial briefs[4] were exchanged on August 22, and responsive briefs[5] on

[2] Letter Gibb to Dossas and Phillips dated July 12, 2008.
[3] This will be referred to as JS; it also includes an Exhibit A, which recites Plaintiff's proposed constructions (and supporting evidence) for the terms that had been identified by Defendants, and an Exhibit B, which sets forth similar information for Defendants' positions.
[4] Plaintiff's will be cited as PB and Defendants' as DB.
[5] Plaintiff's will be cited as PRB and Defendants' as DRB.

September 10. On September 15, the SM circulated a draft report, and on September 24 a hearing was held in Chicago.

GOVERNING LEGAL PRINCIPLES

The Legal Framework for Claim Construction

Proper claim construction necessarily precedes a determination of whether the claims read on the accused devices or methods for infringement purposes.[6] Indeed, claim construction will normally control the remainder of the decisional process,[7] for it is axiomatic that the claims must be construed in the same way for infringement that they are for determining validity.[8]

In its landmark decision in *Markman v. Westview Instr., Inc.,* 517 U.S. 370, 38 USPQ2d 1461 (1996), the Supreme Court held that interpretation of patent claims is a question for the court, while application of properly construed claims to determine infringement is a question for the finder of fact, in this case the jury. In discharging its *Markman* responsibility, the court must inevitably decide what the scope of the underlying evidentiary inquiry will be. The Federal Circuit explained this decisional process in *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 39 USPQ2d 1573 (Fed. Cir. 1996). Ordinarily, the court should confine itself, if possible, to an examination of the intrinsic patent documents: the patent itself and its prosecution history. In most situations, an analysis of the intrinsic evidence alone will resolve any ambiguity in a disputed claim element. In those cases where the public record unambiguously describes the scope of the patented invention, reliance on any extrinsic evidence is improper. Only if there is still some genuine ambiguity in the claims, after consideration of all available intrinsic evidence, should the court resort to extrinsic evidence such as expert testimony. And even if the judge decides to hear all possible evidence before construing the claims, expert testimony inconsistent

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[6] E.g., *Fonar Corp. v. Johnson & Johnson*, 821 F.2d 627, 3 USPQ2d 1109, 1112 (Fed. Cir. 1987).
[7] *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1 USPQ2d 1593, 1597 (Fed. Cir. 1987).
[8] E.g., *Intervet America, Inc. v. Kee-Vet Labs., Inc.*, 887 F.2d 1050, 12 USPQ2d 1474, 1476 (Fed. Cir. 1989).

with the intrinsic evidence should be accorded no weight. Extrinsic evidence in general, and expert testimony in particular, may be used only to help the court come to the proper understanding of the claims; it may not be used to vary or contradict the claim language. Nor may it contradict the import of other parts of the specification. Nor may the inventor's subjective intent as to claim scope, when unexpressed in the patent documents, have any effect.

In its 2005 en banc decision in *Phillips v. AWH Corp.*,[9] the Federal Circuit emphatically reaffirmed its adherence to the fundamental principles of *Markman* and *Vitronics*. In so doing, the court summarized and restated the basic guidelines for interpreting a patent claim:

1. The inquiry into how a person of ordinary skill in the art understands a claim term provides an objective baseline from which to begin claim interpretation. That starting point is based on the well-settled understanding that inventors are typically persons skilled in the field of the invention and that patents are addressed to and intended to be read by others of skill in the pertinent art. Importantly, the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification.[10]

2. In some cases, the ordinary meaning of claim language as understood by a person of skill in the art may be readily apparent even to lay judges, and claim construction in such cases involves little more than the application of the widely accepted meaning of commonly understood words. In such circumstances, general purpose dictionaries may be helpful. In many cases that give rise to litigation, however, determining the ordinary and customary meaning of the claim requires examination of terms that have a particular meaning in a field of art. Because the meaning of a claim term as understood by persons of skill in the art is often not immediately

[9] 415 F.3d 1303, 75 USPQ2d 1321, 1325 (Fed. Cir. 2005).
[10] 75 USPQ2d at 1326.

apparent, and because patentees frequently use terms idiosyncratically, the court looks to sources available to the public that show what a person of skill in the art would have understood disputed claim language to mean. Those sources include the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art.[11]

3. In light of the statutory directive that the inventor provide a "full" and "exact" description of the claimed invention, the specification necessarily informs the proper construction of the claims. It is therefore entirely appropriate for a court, when conducting claim construction, to rely heavily on the written description for guidance as to the meaning of the claims. Not only does the specification provide a concordance for the claims, but the specification may reveal a special definition given to a claim term by the patentee that differs from the meaning it would otherwise possess. In such cases, the inventor's lexicography governs. In other cases, the specification may reveal an intentional disclaimer, or disavowal, of claim scope by the inventor. In that instance as well, the inventor has dictated the correct claim scope, and the inventor's intention, as expressed in the specification, is regarded as dispositive.[12]

4. Like the specification, the prosecution history provides evidence of how the PTO and the inventor understood the patent. Furthermore, like the specification, the prosecution history was created by the patentee in attempting to explain and obtain the patent. Yet because the prosecution history represents an ongoing negotiation between the PTO and the applicant, rather than the final product of that negotiation, it often lacks the clarity of the specification and thus is less useful for claim construction purposes. Nonetheless, the prosecution history can often inform the meaning of the claim language by demonstrating how the inventor understood the

[11] 75 USPQ2d at 1327.
[12] 75 USPQ2d at 1328-29.

invention and whether the inventor limited the invention in the course of prosecution, making the claim scope narrower than it would otherwise be.[13]

5. Extrinsic evidence consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises. Extrinsic evidence in general is less reliable than the patent and its prosecution history in determining how to read claim terms, for several reasons. First, extrinsic evidence by definition is not part of the patent and does not have the specification's virtue of being created at the time of patent prosecution for the purpose of explaining the patent's scope and meaning. Second, while claims are construed as they would be understood by a hypothetical person of skill in the art, extrinsic publications may not be written by or for skilled artisans and therefore may not reflect the understanding of a skilled artisan in the field of the patent. Third, extrinsic evidence consisting of expert reports and testimony is generated at the time of and for the purpose of litigation and thus can suffer from bias that is not present in intrinsic evidence. The effect of that bias can be exacerbated if the expert is not one of skill in the relevant art or if the expert's opinion is offered in a form that is not subject to cross-examination. Fourth, there is a virtually unbounded universe of potential extrinsic evidence of some marginal relevance that could be brought to bear on any claim construction question. In the course of litigation, each party will naturally choose the pieces of extrinsic evidence most favorable to its cause, leaving the court with the considerable task of filtering the useful extrinsic evidence from the fluff. Finally, undue reliance on extrinsic evidence poses the risk that it will be used to change the meaning of claims in derogation of the indisputable public records consisting of the claims, the specification and the prosecution history, thereby undermining the public notice function of patents. In sum, extrinsic evidence may be useful to the court, but it is unlikely to result in a reliable interpretation of patent claim scope

[13] 75 USPQ2d at 1329.

unless considered in the context of the intrinsic evidence. Nonetheless, because extrinsic evidence can help educate the court regarding the field of the invention and can help the court determine what a person of ordinary skill in the art would understand claim terms to mean, it is permissible for the district court in its sound discretion to admit and use such evidence. In exercising that discretion, and in weighing all the evidence bearing on claim construction, the court should keep in mind the flaws inherent in each type of evidence and assess that evidence accordingly.[14]

The guidelines set out above have conditioned the methodology employed in this proceeding. The parties have submitted extrinsic evidence, and the SM has considered it all. In the end, however, apart from whatever benefit this evidence may have provided in gaining an understanding of the technology at hand, it has not been relied upon in construing the claims, unless expressly so indicated.[15] Nor has the SM attempted to articulate his views as to the extrinsic evidence that was considered but not relied upon. Such an undertaking would have been wasteful and of little or no utility, given the fact that in virtually all instances the intrinsic evidence was sufficient to resolve any ambiguity.

The Federal Circuit has recently clarified that any articulated definition of a claim term ultimately must relate to the infringement questions that it is intended to answer.[16] As it said in a 2006 decision:

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[14] 75 USPQ2d at 1329-30.

[15] See *Mantech Environmental Corp. v. Hudson Environmental Serv. Inc*., 152 F.3d 1368, 47 USPQ2d 1732, 1737 (Fed. Cir. 1998), where the Federal Circuit held that "the district court was legally correct both in admitting and accepting the testimony of the parties' expert witnesses 'for the purpose of background in the technical area at issue,' * * * and then basing its claim construction solely upon intrinsic evidence. Although this information always may be admitted by the trial court to educate itself about the patent and the relevant technology, the claims and the written description remain the primary and more authoritative sources of claim construction. Thus, they always must be considered and where clear must be followed." See also *Key Pharm. Inc. v. Hercon Labs. Corp.*, 161 F.3d 709, 48 USPQ2d 1911 (Fed. Cir. 1998).

[16] *E-Pass Tech. Inc. v. 3Com Corp*., 473 F.3d 1213, 81 USPQ2d 1385, 1389 (Fed. Cir. 2007).

> This court, of course, repeats its rule that "claims may not be construed with reference to the accused device." [Citing earlier cases.] As noted earlier, that rule posits that a court may not use the accused product or process as a form of extrinsic evidence to supply limitations for patent claim language. Thus, the rule forbids a court from tailoring a claim construction to fit the dimensions of the accused product or process and to reach a preconceived judgment of infringement or noninfringement. In other words, it forbids biasing the claim construction process to exclude or include specific features of the accused product or process. The rule, however, does not forbid awareness of the accused product or process to supply the parameters and scope of the infringement analysis, including its claim construction component. In other words, the "reference" rule accepted in [earlier cases] does not forbid any glimpse of the accused product or process during or before claim construction. [Citing cases.] In light of these principles, if the litigants cannot themselves inform a trial court of the specific issues presented by the infringement inquiry—that is, issues of the breadth of the claim construction analysis and the most useful terms to facilitate that defining process—then a trial court may refer to the accused product or process for that context during the process.[17]

The parties have not seen fit to provide the SM with information regarding any specific infringement issues that may be impacted by the construction of the claims (although in their responsive briefs they do make some very general allusions). In this particular case, however, that lack of specific information has not been an impediment; the SM has been able to gain sufficient awareness of the probable infringement issues largely by "reading between the lines" of the claim construction arguments.

Plaintiff devotes a very short section (PRB §III) of its response to an allegation that one of the Defendants "misappropriated" computer code, but does not explain how that allegation, even if assumed to be true, could possibly affect the claim construction exercise. A recurrent theme in Defendants' response has to do with their contention that, if the SM rejects certain of their proposed constructions, the patents would effectively cover properly functioning FDCs in addition to defective FDCs. (See, e.g., DRB 2, 18) That contention is addressed in Part B of the Discussion below.

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[17] *Wilson Sporting Goods Co. v. Hillerich & Bradsby Co*., 442 F.3d 1322, 78 USPQ2d 1382, 1389 (Fed. Cir. 2006).

The SM is also mindful of the admonition of the Federal Circuit that "claim construction is not an obligatory exercise in redundancy," and that it is unnecessary to repeat or restate every claim term in order to comply with the *Markman* directive that claim construction is a matter for the court.[18] Such an approach would carry the very real potential of confusing rather than enlightening the jury.[19] Thus, where terms are expressly defined in the patent specification, it is sufficient simply to refer the jury to that definition; the court can decide at the time of trial whether explanatory technical testimony would be necessary or, indeed, helpful at all. And where a term is not defined or used in a special way in the specification, and is otherwise unambiguous, the jury should be instructed to give the term its ordinary meaning and will presumably require no additional assistance.

It is also important to understand that claim construction is an obligation of the court that is independent of the views asserted by the adversary parties.[20] Very recently, however, the Federal Circuit has made it clear that when the parties present a fundamental dispute regarding the scope of a claim term, it is the court's duty to resolve it. A determination that a claim term "needs no construction" or has the "plain and ordinary meaning" may be inadequate when a term has more than one "ordinary" meaning or when reliance on a term's "ordinary" meaning does not resolve the parties' dispute.[21]

Functional Claim Elements under 35 U.S.C. §112¶6

Pursuant to 35 U.S.C. §112¶6, "[a]n element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure,

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[18] *United States Surgical Corp. v. Ethicon, Inc.,* 103 F.3d 1554, 41 USPQ2d 1225, 1236 (Fed. Cir. 1997).
[19] For example, repeatedly instructing a jury that an ordinary English word does not really mean what they think it does, but instead has the meaning of some synonym, can only cause confusion. If they meant not the one but the other, why did the inventors and their attorneys not use the other? This is a question no jury should have to concern itself with.
[20] *Exxon Chem. Patents Inc. v. Lubrizol Corp.*, 64 F.3d 1553, 35 USPQ 1801, 1802 (Fed. Cir. 1995).
[21] *02 Micro Int'l Ltd. v. Beyond Innovation Tech. Co.,* 521 F.3d 1351, 86 USPQ2d 1304, 1311-12 (Fed. Cir. 2008).

material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof." An element of a claim described as a means for performing a function, if read literally, would encompass any means for performing the function. Section 112¶6 operates to cut back on the types of means or steps that could literally satisfy the claim language to only the disclosed structure or acts and equivalents thereof.[22] But unless there is a clear basis for it in the record, it is improper to limit a means-plus-function (MPF) or step-plus-function (SPF) claim to the particular means or steps set forth in the specification. Patentees are required to disclose in the specification some enabling means for accomplishing the function, but there is no requirement that applicants describe or predict every possible means of accomplishing that function. The statute was written precisely to avoid a holding that a MPF limitation must be read to cover only the disclosed means.[23] Accordingly, each MPF or SPF limitation will be construed to cover the actual structure or acts shown in the specification for accomplishing the recited function, *and equivalents thereof*.[24] An equivalent structure or act under §112¶6 cannot embrace technology developed after the issuance of the patent because the literal meaning of a claim is fixed upon its issuance. An "after-arising equivalent" infringes, if at all, under the traditional doctrine of equivalents.[25]

Whether or not particular language in a claim defines, as a matter of law, a MPF element is not always easy to tell. If the word "means" appears in a claim element in association with a function, the court presumes that §112¶6 applies. This presumption collapses, however, if the claim itself recites sufficient structure, material, or acts to perform the claimed function. Without

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[22] *Johnston v. IVAC Corp*., 885 F.2d 1574, 12 USPQ2d 1382, 1386 (Fed. Cir. 1989).
[23] *D.M.I., Inc. v. Deere & Co.,* 755 F.2d 1570, 225 USPQ 236, 238 (Fed. Cir. 1985).
[24] The determination of equivalency under §112¶6 is not part of the claim construction exercise; rather, it is a question of fact. E.g., *Carroll Touch, Inc. v. Electro Mech. Sys., Inc.,* 15 F.3d 1573, 27 USPQ2d 1836, 1840 (Fed. Cir. 1993). See also *IMS Tech. Inc. v. Haas Automation Inc.*, 206 F.3d 1422, 54 USPQ2d 1129, 1134 (Fed. Cir. 2000).
[25] *Al-Site Corp. v. VSI Int'l Inc.,* 174 F.3d 1308, 50 USPQ2d 1161, 1168 (Fed. Cir. 1999).

the term "means," a claim element is presumed to fall outside MPF strictures. Once again, however, that presumption can collapse when an element lacking the term "means" nonetheless relies on functional terms rather than structure or material to describe performance of the claimed function.[26] The task of determining whether the limitation in question should be regarded as a MPF limitation, like all claim construction issues, is a question of law for the court, even though it is a question on which evidence from experts may be relevant.[27]

Once a court establishes that a MPF limitation is at issue, it must construe that limitation, thereby determining what the claimed function is and what structures disclosed in the written description correspond to the "means" for performing that function.[28] Corresponding structure need not include all things necessary to enable the claimed invention to work, but it must include all structure that actually performs the recited function.[29] A structure disclosed in the specification is deemed to be "corresponding structure" only if the specification clearly links or associates that structure to the function recited in the claim. The duty to link or associate structure in the specification with the function is the quid pro quo for the convenience of employing §112¶6.[30] Unless structures are clearly associated with the claimed function, they cannot be corresponding structures for purposes of §112¶6. Although expert testimony and declarations are useful to confirm that the construed meaning is consistent with the denotation ascribed by those in the field of the art, such extrinsic evidence cannot be used to clearly link the claimed function with allegedly corresponding structure.[31]

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[26] E.g., *Micro Chem. Inc. v. Great Plains Chem. Co.*, 194 F.3d 1258, 52 USPQ2d 1258 (Fed. Cir. 1999).
[27] *Lighting World Inc. v. Birchwood Lighting Inc.*, 382 F.3d 1354, 72 USPQ2d 1344, 1348 (Fed. Cir. 2004).
[28] *Kemco Sales Inc. v. Control Papers Co.,* 208 F.3d 1352, 54 USPQ2d 1308, 1312 (Fed. Cir. 2000).
[29] *Cardiac Pacemakers Inc. v. St. Jude Med. Inc.,* 296 F.3d 1106, 63 USPQ2d 1725, 1734 (Fed. Cir. 2002).
[30] *Kahn v. General Motors Corp.*, 135 F.3d 1472, 45 USPQ2d 1608, 1611 (Fed. Cir. 1998).
[31] *Omega Eng'g Inc. v. Raytek Corp.*, 334 F.3d 1314, 67 USPQ2d 1321, 1334 (Fed. Cir. 2003).

Similar analysis governs method limitations.[32] However, the Federal Circuit seems inclined toward a somewhat more rigid examination of whether a method limitation (as opposed to an apparatus limitation) is, as a matter of law, drafted in such a way that it clearly mirrors the statutory template. As that court said in 2002,

> Where the claim drafter has not signaled his intent to invoke §112, paragraph 6 by using the "step[s] for" language, we are unwilling to resort to that provision to constrain the scope of coverage of a claim limitation without a showing that the limitation contains nothing that can be construed as an act. Method claims are commonly drafted, as in this case, by reciting the phrase "steps of" followed by a list of actions comprising the method claimed. An application of §112, paragraph 6 in the present circumstances would render the scope of coverage of these method claims uncertain and disrupt patentees' settled expectations regarding the scope of their claims. . . . We thus hold that where a method claim does not contain the term "step[s] for," a limitation of that claim cannot be construed as a step-plus-function limitation without a showing that the limitation contains no act.[33]

Likewise, a showing that a method step recitation contains no act is more problematic than in the case of apparatus limitations (where it is required to show that the "means" recitation contains no structure):

> In general terms, the "underlying function" of a method claim element corresponds to *what* that element ultimately accomplishes in relationship to what the other elements of the claim and the claim as a whole accomplish. "Acts," on the other hand, correspond to *how* the function is accomplished. Therefore, claim interpretation focuses on what the claim limitation accomplishes, i.e., it's [sic] underlying function, in relation to what is accomplished by the other limitations and the claim as a whole. If a claim element recites only an underlying function without acts for performing it, then Section 112, Para. 6 applies even without express step-plus-function language.[34]

As will become apparent, potential MPF and SPF issues are encountered in interpreting the asserted claims of the patents in suit. Two of the apparatus elements are couched in

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[32] *O.I. Corp. v. Tekmar Co.,* 115 F.3d 1576, 42 USPQ2d 1777, 1781–82 (Fed. Cir. 1997).
[33] *Masco Corp. v. United States,* 303 F.3d 1316, 64 USPQ2d 1182, 1189 (Fed. Cir. 2002). See also *Cardiac Pacemakers Inc. v. St. Jude Med. Inc.,* 381 F.3d 1371, 72 USPQ2d 1333, 1341 (Fed. Cir. 2004).
[34] *Seal-Flex Inc. v. Athletic Track & Court Constr.,* 172 F.3d 836, 50 USPQ2d 1225, 1233 (Fed. Cir. 1999) (Rader, J. concurring), cited with approval in *Masco Corp. v. United States,* 303 F.3d 1316, 64 USPQ2d 1182, 1188–89 (Fed. Cir. 2002).

presumptive MPF language and at least three more, while not employing the presumption-triggering "means" signal, are so functional and lacking in structure that they demand §112¶6 analysis. And although none of the method limitations of various claims appear to invoke a presumption of SPF treatment (in that they lack the presumption-triggering "step for" signal), they must, nonetheless, be analyzed to determine whether they recite an act in addition to the underlying function.

The Timing of the Inquiry

In *Phillips v. AWH*, the Federal Circuit explained that "the ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application."[35] At first glance, this approach may seem inconsistent with the undoubted principle that the prosecution history is an important source of intrinsic evidence in interpreting claims because it is a contemporaneous exchange between the applicant and the Examiner. The public has the right to rely on an applicant's remarks made in seeking allowance of claims.[36] These transactions always take place after – sometimes long after – the effective filing date of the patent application. But the prosecution history of the patent can be given full play by simply viewing it as would a hypothetical person of ordinary skill in the art who, though reading it later, was basing an understanding of it upon knowledge of the scope and content of the prior art as it existed at the time of invention. The claim construction analysis in this report has been conducted, therefore, by seeking to understand what the claims would have meant to a person of ordinary skill in the art, having knowledge of the art as it existed as of the filing dates of the patents in suit.

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[35] *Phillips v. AWH Corp.*, 415 F.3d 1303, 75 USPQ2d 1321, 1326 (Fed. Cir. 2005).
[36] *Desper Prods. Inc. v. Qsound Labs. Inc.*, 157 F.3d 1325, 48 USPQ2d 1088, 1096-97 (Fed. Cir. 1998).

Person of Ordinary Skill in the Art

Neither side has made any effort to define the level of ordinary skill in this art as of the filing dates of the various patents in suit. For want of any contrary evidence, common sense dictates that a person of ordinary skill in this art as of the relevant time periods would have had at least a first degree in computer science or electronics and several years experience with computer systems in general and with the design or analysis of computer components.

Indefiniteness Under 35 U.S.C. §112¶2

No discussion of claim construction would be complete without some mention of the defense of claim indefiniteness pursuant to 35 U.S.C. §112¶2. Whether the claims of a patent satisfy the requirement of §112¶2 that they particularly point out and distinctly claim the subject matter that the inventor regards as the invention must be resolved as part of the court's performance of its duty as construer of patent claims.[37] If the meaning of the claim is discernible, in the sense that it is not insolubly ambiguous, invalidity on indefiniteness grounds is avoided.[38] For a claim to comply with §112 ¶2, it must satisfy two requirements: first, it must set forth what "the applicant regards as his invention," and second, it must do so with sufficient particularity and distinctness.[39] The requirement to "distinctly" claim means that the claim must have a meaning discernible to one of ordinary skill in the art when construed according to correct principles.[40] Claims must be amenable to construction. A claim is indefinite under §112 ¶2 if it is insolubly ambiguous and no narrowing construction can properly be adopted.[41] Claims as

[37] *Personalized Media Comm. LLC v. United States ITC,* 161 F.3d 696, 48 USPQ2d 1880, 1888 (Fed. Cir. 1998).
[38] E.g., *Bancorp Serv. LLC v. Hartford Life Ins. Co.,* 359 F.3d 1367, 69 USPQ2d 1996, 1999 (Fed. Cir. 2004).
[39] E.g., *Solomon v. Kimberly-Clark Corp.,* 216 F.3d 1372, 55 USPQ2d 1279, 1282 (Fed. Cir. 2000).
[40] E.g., *Metabolite Labs. Inc. v. Laboratory Corp. of Am. Holdings,* 370 F.3d 1354, 71 USPQ2d 1081, 1089 (Fed. Cir. 2004).
[41] E.g., *Exxon Res. & Eng'g Co. v. United States,* 265 F.3d 1371, 60 USPQ2d 1272, 1276 (Fed. Cir. 2001).

granted are accompanied by a presumption of validity based on compliance with §112 ¶2,[42] and the challenger in litigation must produce clear and convincing contrary evidence.[43]

THE PATENTS IN SUIT

Phillip M. Adams, a principal in Plaintiff, is the named inventor on each of the five patents in suit. The patents generally involve computer technology; more specifically, they disclose systems and methods for dealing with problems that arise due to a defect or design flaw in a floppy diskette controller (FDC). An FDC interfaces a computer's central processing unit (CPU) with a floppy diskette drive, and controls the flow of data between the CPU and the floppy diskette or other non-volatile storage medium.

The prosecution of the five patents in suit was relatively straightforward and uneventful, at least from the standpoint of claim construction. Nothing that occurred during prosecution appears to shed much light on the meaning of the claim terms that are contested by the parties. Defendants do invoke the prosecution histories of the '414 patent (DB 10-13), the '002 patent (DB 18), and the '858 patent (DRB 37) but, as will be seen, the transactions were inconsequential from the standpoint of claim construction.

In the following claim recitations, the boldface underlined terms are those that Defendants have identified as requiring construction. The terms that are set off by asterisks (*) are those that appeared on both sides' "top ten" lists of "most significant terms." (JS 3-4) Those set off by plus signs (+) are considered by Plaintiff to be significant (JS 4) and those set off by carets (^) are considered by Defendants to be significant (JS 5). As will become apparently immediately below, this clearly translates to a heightened importance for claim 1 of the '414 patent in suit, which is a method claim having both structural and functional limitations.

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[42] E.g., *S3 Inc. v. nVIDIA Corp.,* 259 F.3d 1364, 59 USPQ2d 1745, 1747 (Fed. Cir. 2001).
[43] E.g., *Budde v. Harley-Davidson Inc.,* 250 F.3d 1369, 58 USPQ2d 1801, 1806 (Fed. Cir. 2001).

U.S. Patent No. 5,379,414 ('414 patent) (claim 1)

The '414 patent issued January 3, 1995 on an application filed July 10, 1992. It has 7 claims to a method for detecting and preventing FDC data transfer errors in computer systems. Claim 1 reads as follows:

> 1. A method for detecting and preventing floppy diskette controller data transfer errors in computer systems having:
> a **+central processing unit (CPU)+**;
> a **system interrupt timer**;
> a **floppy diskette**, the floppy diskette having at least one sector for receiving multiple data bytes;
> **+a floppy diskette controller (FDC) for controlling the transfer of data to the floppy diskette+**;
> **means associated with the FDC for providing a data request (DREQ) signal and a data acknowledge (DACK) signal, the DREQ signal being provided when data transfer is requested and the DACK signal being provided when data transfer is permitted**;
> and ***means for counting data bytes transferred to the floppy diskette, said counting means providing a data transfer byte count***,
> the method comprising the steps of:
> ***determining*** if a requested computer system operation is a floppy diskette write operation;
> ***reading*** the data transfer byte count provided by said counting means;
> ***monitoring*** data byte transfers to the floppy diskette so as to determine when a last data byte is being transferred to a sector of the floppy diskette;
> ***measuring*** time between the data request (DREQ) and data acknowledge (DACK) signals for said last data byte transfer to a sector of the floppy diskette;
> and **^forcing^** an error condition if the measured time between said DREQ and DACK signals exceeds a specified value.

Unfortunately, as can be seen, Defendants' position appears to demand a *Markman* analysis of every element of the claim.

U.S. Patents Nos. 5,983,002 ('002 patent) (claims 1-6 & 8-15) & 6,401,222B1 ('222 patent) (claims 1-7, 9-16 & 18-20)

The '002 patent issued November 9, 1999 on an application filed October 11, 1996. It has 15 claims dealing variously with apparatus for detecting a defective FDC, and a device and

method for detecting an underrun error that is not detected by a FDC. The asserted claims are as follows:

> 1. An apparatus for detecting a **defective floppy diskette controller**, the apparatus comprising:
> a **^processor executing detection executables effective to determine an underrun error undetected by a floppy diskette controller^** and effective to identify the floppy diskette controller as defective;
> a memory device operably connected to the processor to store the detection executables and corresponding detection data;
> a **system clock** operably connected to the processor to provide a time base;
> a media drive comprising storage media for storing data;
> the floppy diskette controller operably connected to the media drive to control formatting and storage of data on the storage media; and
> a direct memory access controller operably connected to the floppy diskette controller and the memory device to control transfers of data between the memory device and the floppy diskette controller.
>
> 9. The apparatus of claim 8 wherein the application is effective to **determine on demand** whether the floppy diskette controller is susceptible to undetected underrun errors.
>
> 10. The apparatus of claim 1 wherein the detection executables include a **shadowing executable** effective to determine when a last byte is to be transferred from the direct memory access controller to the floppy diskette controller.
>
> 11. A memory device operably connected to a processor,
> a direct memory access controller,
> a floppy diskette controller controlled by the direct memory access controller,
> and a media drive controlled by the floppy diskette controller, the memory device storing blocks of data comprising:
>
> a test pattern;
> **detection executables effective to be run on the processor to force and detect an underrun error not detected by the floppy diskette controller**;
> and a readback buffer to store a copy of the test pattern read back from the media drive.
>
> 12. A method for detecting an underrun error undetected by a floppy diskette controller, the method comprising the steps of:
> **writing** a source test pattern from a memory device to storage media in a media drive controlled by the floppy diskette controller;
> **interrupting** the writing step;

delaying a transfer of a last byte of the source test pattern to the floppy diskette controller to create the underrun error;

completing the writing step;

verifying whether the floppy diskette controller detected the underrun error.

13. The method of claim **12** further comprising **reading** back to the memory device a written test pattern corresponding to the source test pattern written during the writing step.

14. The method of claim 13 further comprising **verifying** whether the underrun error occurred in the writing step by checking the last byte of the written test pattern.

15. An apparatus for detecting a defective floppy diskette controller, the apparatus comprising:

a **processor executing detection executables effective to precipitate and detect an underrun error undetected by a floppy diskette** controller and effective to identify the floppy diskette controller as a defective floppy diskette controller;

a memory device operably connected to the processor to store the detection executables and corresponding detection data;

a **system clock** operably connected to the processor to provide a time base;

a media drive comprising storage media for storing data;

the floppy diskette controller operably connected to the media drive to control formatting and storage of data on the storage media; and a direct memory access controller operably connected to the floppy diskette controller and the memory device to control transfers of data between the memory device and the floppy diskette controller.

The ‘222 patent issued June 4, 2002, on an application filed December 4, 1998 as a continuation-in-part (CIP) of the application that led to the ‘002 patent. It contains 12 claims that are similar to the ‘002 patent claims (in that they focus on a defective FDC) and 8 claims that approach the problem somewhat more broadly, reciting a method for testing controllers that control input/output (I/O) to non-volatile memory devices. The apparatus claims contain essentially the same contested terms as those in the ‘002 patent. Method claim 13 recites:

13. A method for testing controllers for controlling I/O to non-volatile memory devices, the method comprising:

providing a detection executable configured to interrupt a writing step of a controller;

delaying a transfer of a byte, corresponding to the writing step, for a time selected to cause an under run error in the transfer; and

verifying whether the controller detects an error in completing the writing step.

15. The method of claim 13**,** wherein the detection executable is configured to read a data count corresponding to the writing step.

16. The method of claim **15,** further comprising **reading** a data count, corresponding to the writing step, from a direct memory access controller's data transfer count register.

19. The method of claim **13,** further comprising **increasing** an interrupt rate corresponding to interrupting the writing step.

20. The method of claim **13,** further comprising **causing** and **detecting** a transfer corresponding to a last byte of a sector.

U.S. Patent No. 6,195,767B1 ('767 patent) (claims 1 & 10-12)

The '767 patent issued February 27, 2001 on an application filed September 14, 1998. It has 26 claims directed to an apparatus and method for detecting data corruption resulting from defective operation of a FDC.

1. An apparatus for detecting data corruption resulting from defective operation of a floppy diskette controller, the method [sic. apparatus] comprising:

a storage medium containing data disposed in a series of bytes;

a processor operably connected to the storage medium and programmed to execute a signature detection module, the signature detection module being effective to detect improper storage of the bytes, wherein the improper storage results from an error of a type causing erroneous replication of a byte in a sector of a storage medium;

a memory device operably connected to the processor for storing the signature detecting module.

12. A method for detecting data corruption resulting from defective operation of a floppy diskette controller, the method comprising:

writing data as data bytes to a storage medium;

identifying **a demarcation rule** effective to reflect a correspondence of data bytes to the sector size of the storage medium and effective to identify a first byte, a last byte, and a next-to-last byte corresponding to the sector size;

scanning the data bytes in accordance with the demarcation rule;

and detecting erroneous replication of bytes within a segment of data corresponding to the sector size.

U.S. Patent No. 6,687,858B1 ('858 patent) (claims 1, 3 & 4)

The '858 patent issued February 3, 2004 on an application filed May 16, 2000. It has 6 claims directed to an apparatus for extending the functionality of a defective FDC, and 20 more directed to a method for "welding" a persistent software layer to a hardware layer in a computer system. Only the former are in play here. Claim 1 recites:

> 1. An apparatus for extending the functionality of a defective floppy diskette controller, the apparatus comprising
> a computer readable medium storing executable and operational data structures, the data structures comprising:
> **a determination module for identifying a hardware resource associated with a computer system**;
> ***a welding module for inseparably connecting a persistent software layer to the hardware resource***.

DISCUSSION

There are three thorny issues that are ubiquitous in Defendants' presentation of their proposed claim constructions, and it is more efficient and logical to address these first, in subsections A-C below. Subsection D addresses the remaining issues, and gives the SM's recommended constructions for all of the disputed claim terms. The terms discussed in subsection D are numbered for convenient reference.

Of course, a dependent claim includes all of the limitations of the claims from which it depends and must be viewed as though it had originally been an independent claim.[44] Therefore, the construction of a term in an independent claim will necessarily apply to claims dependent upon it. Indeed, unless otherwise indicated, the construction of a term in one claim will be

[44]See *Kloster Speedsteel AB v. Crucible Inc.,* 793 F.2d 1565, 230 USPQ 81, 83, 88 (Fed. Cir. 1986).

applicable to identical terms in other claims, whether in the same or different ones of the patents in suit.

At the outset, it should be clearly understood that the SM is well aware of the boiler-plate caveats that appear in almost all U.S. patents. For example, the '002 patent says:

> It will be readily understood that the components of the present invention, as generally described and illustrated in the Figures herein, could be arranged and designed in a wide variety of different configurations. Thus, the following more detailed description of the embodiments of the system apparatus and method of the present invention, as represented in FIGS. 1 through 7, is not intended to limit the scope of the invention, as claimed, but it is merely representative of the presently preferred embodiments of the invention. (C5L34-43) [45]

And again, just prior to its claims:

> The present invention may be embodied in other specific forms without departing from its spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrative, and not restrictive. The scope of the invention is therefore, indicated by the appended claims, rather than by the foregoing description. All changes which come within the meaning and range of equivalency of the claims are to be embraced within their scope. (C13L7-14)

Each of the patents in suit contains similar caveats. Nonspecific statements like these, which do not focus on particular claim elements, are not very helpful in the claim construction exercise. The SM has considered them, and has given them the weight they deserve, but they have not played any decisive role in construing the claims, despite Plaintiff's several references to them as intrinsic evidence.

It should also be understood that the SM is well aware of the fine and tortured difference between construing a claim term in light of the specification and reading a limitation from the specification into the claim.[46] The former is required; the latter forbidden. But drawing the line is one of the most difficult jobs facing a patent lawyer or judge. Defendants have repeatedly

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[45] This notation signifies that the passage occurs at a particular column (C) and lines (L) of the patent referred to.
[46] See, e.g., *Comark Comm. Inc. v. Harris Corp.,* 156 F.3d 1182, 48 USPQ2d 1001, 1005 (Fed. Cir. 1998).

suggested constructions that tend toward the forbidden ground and the SM has rejected most of them. Even if certain constructions recommended by the SM appear to Plaintiff to have encroached into forbidden territory, it should be understood that the SM has made the recommendation with the dichotomy well in mind and has attempted to explain his reasoning.

Defendants have requested consideration and construction of many, but certainly not all, of the terms of the various claims of the patents in suit. The SM has considered each claim as a whole, and each element of each claim, and has recommended a specific interpretation of those terms and phrases, and only those terms and phrases, that require construction. Accordingly, to the extent various claim terms are not addressed in this report, it may be assumed that the SM is recommending that they be grouped in the category of claim elements that need no construction. Similarly, this report is not to be viewed as reflecting an acceptance or endorsement by the SM of any proposed construction of either party, unless it expressly so states. The fundamental approaches of the parties have been quite different. Defendants, by and large, seek to have additional limitations added to the language of the claims; Plaintiff, on the other hand, characteristically suggests synonyms for words that appear in the claims. Neither approach, as will be seen, is entirely appropriate in this case.

Part A. What is a "floppy diskette"? A "floppy diskette controller" (FDC)?

The term "floppy diskette" occurs in most of the asserted claims of the patents in suit, at least once standing alone (as in claim 1 of the '414 patent) but usually as a modifier in the term "floppy diskette controller." As will be seen, where the term "floppy diskette" is used alone, it has a narrower meaning; but when it is used as a modifier, it may have a broader meaning.

It is clear from the patent specifications that the term "floppy diskette" refers to a portable data storage medium to which data can be recorded and from which it can be retrieved.

The SM's own experiences with personal computers over the past three decades, while not evidence, do inform his rudimentary understanding of the technology involved. In the late 1970s, his first TRS 80 (Model I) employed magnetic tape as the portable storage medium. Over the years, newer computers came and went, and portable storage media progressed to the familiar 5-1/4 inch and 3-1/2 inch "floppys" that were essentially flexible magnetic diskettes designed to spin within a protective envelope or housing; then to "ZIP" drives, which also employed spinning magnetic disc technology; and then to portable hard drives, likewise spinning magnetic disks or platters. All of the devices use magnetic "heads" for recording and retrieving data to and from the magnetic medium. Now, the SM enjoys a wider range of choices, including writable CDs (CD-R and CD-RW) and DVDs, which are so-called "optical" devices that do not employ a magnetic storage medium; rather, they are spinning discs coated with special material that use laser technology for recording and retrieving data. Finally, there is so-called "solid-state" or "flash" memory, such as the familiar SD (and other) memory cards that are also used in digital cameras, and so-called "memory sticks" or "jump drives." These solid-state memory devices do not spin and, indeed, typically have no moving parts; they employ direct electrical connections to and from the camera or computer to record and retrieve data.

Defendants contend "floppy diskette" means a "flexible magnetic disk enclosed in a protective container" (JS Ex. B at 3). Plaintiff, much more expansively, says it is a "storage medium used to store digital data" (JS Ex. A1 at 7). Plaintiff's version would encompass all of the portable memory media types mentioned above, and undoubtedly additional types with which the SM is unfamiliar; it is not limited to magnetic technology, or even to spinning systems.

Reading the '414 patent as a whole leaves no doubt that a person of skill in this technology, back in 1992 (some 16 years ago), would have understood the term "floppy diskette," standing alone, to be referring to the then-familiar 3-1/2 or 5-1/4 inch magnetic disks. In describing the problem addressed by the invention, the patent states: "[s]ignificantly, since the diskette 40 is spinning, it is necessary for the FDC to provide data to the diskette drive at a specified data rate" (C1L40-42). This would necessarily exclude solid-state memory devices, absent further explanation. The patent continues: "[s]pecifically, data loss and/or data corruption can occur during data transfers to diskettes (or even tape drives and other media which employ the FDC)" C1L54-57). This statement tends to establish two things: the inventor considered diskettes as distinct from "tape drives and other media" and he also contemplated that an FDC might be used to control memory other than diskettes.[47]

Also, Plaintiff relies on Federal Standard 1037C definition of a "floppy diskette" in computer technology as:

> a small disk of flexible plastic, coated with a magnetizable material and enclosed in a protective jacket, used to store digital data. Note: A diskette is distinguished from a hard disk by virtue of the fact that it is flexible, and unlike most hard disks, is removable from its drive. Synonyms flexible disk, floppy disk. (JS Ex. A1 at 10)

This extrinsic evidence obviously tends to support Defendants' proposed definition, not Plaintiff's. Defendants cite similar extrinsic evidence that supports their position (JS Ex. B at 4-5)

Accordingly, the term "floppy diskette," as used in claim 1 of the '414 patent, means a magnetic disk adapted to spin within a protective jacket in a diskette drive. This also

[47] This is an extremely important concept. Despite the name, a "floppy diskette controller" apparently can control data transfer to and from various types of storage media in addition to traditional "floppy diskettes." A better term might have been "storage media controller" but once the electronics industry settles on a name for a device it is difficult to pry them loose from it, even when it becomes misdescriptive.

necessarily means that the "floppy diskette controller" recited in claim 1 of the '414 patent must be one that is capable of controlling the transfer of data to and from such a "floppy diskette."

It should not be supposed, however, that the foregoing definition of "floppy diskette" as a stand-alone term in claim 1 of the '414 patent necessarily rules the definition of "floppy diskette controller" in the asserted claims of the four remaining patents in suit. These patents all add disclosure and must be independently evaluated. Thus, while the '002 and '222 patents contain the recitations quoted above from the '414 patent ('002 patent, C1L39-41 & L53-56; '222 patent C1L47-49 & 60-63), there are additional disclosures that are pertinent. For example, Fig. 1 in both patents is a schematic illustrative of a computer system architecture ('002 Patent, C4L52-55; '222 Patent, C4L64-67). It shows an FDC 20 connected to a "Media Drive (e.g. Floppy Diskette Drive)" designated by reference numeral 16 ('002 Patent, C10L16-17; '222 Patent, C10L30-31). In keeping with this broader disclosure, the asserted claims of the '002 patent each recite "a media drive comprising storage media for storing data" controlled by the FDC, or language to the same effect, while the asserted claims of the '222 patent simply call for "non-volatile memory devices." This is in contradistinction to the '414 patent, where Fig. 1 shows merely a "Floppy Diskette Drive" 50 and claim 1 specifies a "floppy diskette." Thus the inventor of the '002 and '222 patents clearly contemplated – and, indeed, *claimed* – portable storage media that were not limited only to traditional floppy diskettes. However, the emphasis on "spinning" did not change from the '414 to the '002, so that solid-state storage media are still precluded. In addition, the '222 patent teaches:

> One such specific implementation involves substituting a magnetic tape back-up device or an optical device, or other such peripheral, non-volatile memory device for the floppy drive previously described in the specific embodiment of the

> method. In so doing, the method substantially as disclosed is employed, substituting the use of the alternate peripheral, non-volatile memory device for the floppy drive. Appropriate commands are also substituted, as would be readily apparent to one skilled in the pertinent art. (C13L50-59)

To summarize, the claims of the '002 and '222 patents are not limited to a system or method in which the FDC is controlling a "floppy diskette" as that term was defined for the '414 patent; other types of spinning storage media may be employed.

The claims of the '767 patent are structured somewhat differently. The only mention of a "floppy diskette" occurs in the preambles of the asserted claims, which recite an apparatus (claims 1, 10 & 11) or method (claim 12) "for detecting data corruption resulting from defective operation of a *floppy diskette controller*." (Emphasis added.) The claims then go on to recite, broadly, a "storage medium" which is to be tested for data corruption. Indeed, claim 11 actually narrows the scope of claim 1 in this respect:

> 11. The apparatus of claim 1, wherein the storage medium is selected from the group consisting of magnetic media, optical media, magneto-optical media, and electronic media.

The specification supports this breadth; thus:

> a storage device 16 may include a storage medium 86. The storage medium 86 may contain one or more disks or diskettes. In general, data corruption may be initiated by a defective floppy diskette controller on a particular diskette. However, in general, a file or sector thus corrupted may be copied to any other memory device 14. Thus, a storage device 16 being tested for corruption may be a diskette, a hard disk, or other storage device 14 to which data may have been transferred subsequent to storage on a floppy diskette. ('767 Patent, C8L19-27)

And again: "However, tapes, hard drives, volatile or other random access memory 20 may also be tested, and need not be arranged by the sector scheme or other physical media 86." (C13L39-42)

Thus the "storage medium" that is the claimed subject of the data corruption testing is pretty much unlimited. But does this mean that the use of the modifier "floppy diskette" in the

claims' preambles puts a limitation on the type of storage device, under control of an FDC, in which the data corruption was initiated? The specification, quoted above, would seem to so indicate: "In general, data corruption may be initiated by a defective floppy diskette controller on a particular diskette." Consequently, if the preamble is itself a claim limitation, the storage device controlled by the FDC would have to be, like those in the '002 and '222 patents, selected from the group consisting of spinning devices.

The question of whether a preamble statement constitutes a limitation for a claim has received a good deal of attention from the Federal Circuit, but no bright-line test has emerged. That court has frequently said that a preamble term that is necessary to "give meaning to" the claim is a limitation that may not be disregarded. [48] But to say that a preamble phrase is a limitation if it gives "meaning to the claim" may merely state the problem rather than lead to the answer. No litmus test can be given with respect to when the introductory portions of a claim, the preamble, constitute a statement of purpose for a device or are, in themselves, additional structural limitations of a claim that can be relied upon to avoid anticipation.[49] Whether a preamble stating an intended purpose constitutes a limitation to the claim depends on whether the language is essential to particularly point out the invention.[50] Where a patentee uses the claim preamble to recite structural limitations of the claimed invention, the PTO and courts give effect to that usage. Conversely, where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention, the preamble is not a claim limitation. The inquiry involves examination of the entire patent record to determine what invention the patentee intended to define and protect.[51]

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[48]See, e.g., *Bell Comm. Research v. Vitalink Comm. Corp.,* 55 F.3d 615, 34 USPQ2d 1816, 1820 (Fed. Cir. 1995).
[49]*Corning Glass Works v. Sumitomo Elec. U.S.A., Inc.,* 868 F.2d 1251, 9 USPQ2d 1962, 1966 (Fed. Cir. 1989).
[50]See *Diversitech Corp. v. Century Steps, Inc.,* 850 F.2d 675, 7 USPQ2d 1315, 1317 (Fed. Cir. 1988).
[51]*Rowe v. Dror,* 112 F.3d 473, 42 USPQ2d 1550, 1553 (Fed. Cir. 1997).

In the view of the SM, the preamble of the asserted '767 patent claims does more than merely state a purpose or intended use for the claimed invention. The invention is an apparatus and method for detection of data corruption on some storage medium. The inventor was obviously concerned with data corruption resulting in the first instance from a defective FDC; this concern is repeated throughout the patent. There is nothing in the patent that would take the defective FDC out of the ambit of the invention. Indeed, a defective FDC appears to be *sin qua non* and therefore essential to particularly point out the invention. **Accordingly, the asserted claims of the '767 patent are limited to a system or method in which the data corruption being tested is caused by a defective FDC controlling some type of spinning storage media.**

The claims of the '858 patent are different still. They do not speak in terms of any storage medium that is controlled by an FDC. The preamble simply recites "apparatus for extending the functionality of a defective floppy diskette controller" and the body of claim 1 goes on to recite the software necessary to accomplish this goal. Strangely, the claim seems to switch gears in the body and refers to what can only be the defective FDC as "a hardware resource associated with a computer system." The broader term "hardware resource" is used several times in the paragraphs bridging columns 5 and 6 of the specification, and then one more isolated time at C15L49, but never does the specification explain what the difference, if any, may be. If the preamble did not use the term "defective floppy diskette controller," it might be possible to interpret the claim simply as a way to identify *any* hardware resource in the system and to inseparably connect a persistent software layer to that hardware resource. But the preamble *does* use that term and that term, like the similar term in the preamble of the '767 patent claims, gives meaning to the claim and is essential to particularly point out the invention.

As in the case of the '002, '222, and '767 patents, however, the '858 patent does not limit the storage medium to a magnetic diskette as required by the '414 patent. As the specification teaches:

> One such specific implementation involves substituting a magnetic tape back-up device or an optical device, or other such peripheral, non-volatile memory device for the floppy drive previously described in the specific embodiment of the method. In so doing, the method substantially as disclosed is employed, substituting the use of the alternate peripheral, non-volatile memory device for the floppy drive. ('858 Patent, C18L26-32)

And again, "[h]erein, references to a floppy diskette may be read as 'any media' and a floppy diskette drive is but a specific example of a media drive controllable by an FDC" (C2L6-8). These statements are broad enough to comprehend any storage medium controlled by the FDC, including solid-state memory. **Accordingly, in the asserted claims of the '858 patent, the "hardware resource" is a defective FDC which controls some type of non-volatile memory storage medium.**[52]

Part B. **Should any claim terms be limited to "outside of the FDC"?**

None of the asserted claims of the patents in suit appears to require that the software that is part of the claimed inventions be executed "outside of the FDC." Nonetheless, Defendants contend that certain claim elements must be so construed. Thus, they argue that the CPU of element numbered (23) of the '414 patent (as identified in Part D of this report) is to be construed as "not part of the FDC" (JS Ex. B at 5) and likewise for the "processor" of elements (27), (31) and (32) of the '002 and '222 patents (JS Ex. B at 26, 37, 41) and of element (33) of the '767 patent (JS Ex. B at 42). Similarly, Defendants argue that the software modules of elements (4) and (5) of the '858 patent are application programs "executing outside of the FDC" (JS Ex. B at 47, 53).

[52] The Court may wish to instruct that jury that, in this context, "non-volatile" memory is a medium that does not require periodic refreshing of the data stored in it.

Claim 1 of the '414 patent expressly calls for "a central processing unit (CPU)." In contrast, none of the asserted claims of the other four patent uses that term. Independent claims 1 and 15 of the '002 patent and claim 1 of the '222 patent call for "a processor executing detection executables" and requires that a "system clock" and a "memory device" be "operably connected to the processor." Independent claim 1 of the '767 patent requires a "processor operably connected" to a storage medium and to a memory device. Independent claims 11 of the '002 patent and 12 of the '222 patent define a "memory device connected to a processor" and require "detection executables effective to be run on the processor." The asserted claims of the '858 patent do not employ the term "processor" at all.

In the view of the SM, there is a significant difference in meaning between the terms "CPU" and "processor." Most of us, and doubtless those of skill in the art back in 1992 when the '414 patent application was filed, think of a CPU as the powerful microprocessor chip that constitutes the heart of our personal computers. Indeed, the Federal Circuit has held, based upon an industry standard definition, that "[t]he ordinary meaning of CPU is '[t]he unit of a computing system that includes the circuits controlling the interpretation of instructions and their execution.' IEEE 171."[53] This accords fairly well with many ordinary dictionary definitions. For example:

- ***noun*:** (computer science) the part of a computer (a microprocessor chip) that does most of the data processing; the CPU and the memory form the central part of a computer to which the peripherals are attached. (Available at http://www.rhymezone.com/r/rhyme.cgi?Word=Cpu)

- (*computing*) The part of a computer that fetches, decodes and executes instructions; attached directly to the memory. Abbreviated: CPU. (Available at "http://en.wiktionary.org/wiki/central_processing_unit")

[53] *Seachange Int'l Inc. v. C-COR Inc.*, 413 F.3d 1361, 75 USPQ2d 1385, 1395 (Fed. Cir. 2005).

Claim 1 of the '414 expressly calls out a CPU, and the claim must be evaluated in that light. To hold that the CPU could be *part of* the FDC would mean that the FDC was "controlling the interpretation of instructions and their execution" for the *entire* computer system. This would render the term CPU superfluous.

The plain word "processor," however, is quite another matter. There is nothing in any of the patents to indicate that the inventor intended to limit this term to the CPU of the system, or to preclude any processor functions called out in the '002, '222, and '767 claims from employing processing capability that might be present in an FDC or, for that matter, any other component of the computer system. And to construe the software modules of the '858 claims as elements that must be executed completely outside of the FDC, despite the lack of any usage of the word "processor" in those claims, seems even more inappropriate.

Accordingly, claim 1 of the '414 patent should be construed to require a CPU that is separate from the FDC and that controls the interpretation of instructions and their execution; no such limitation should be applied to the term "processor" in the asserted claims of the remaining patents.

This "outside the FDC" contention raises another broad issue that requires some discussion. Basically, Defendants are saying that the invention of these patents, stripped to its fundamentals, is identifying defective FDCs that cause data corruption errors and remedying the defect without replacing the FDC. The question then arises, according to Defendants: What about a redesigned FDC that incorporates the remedy? In other words, can the Defendants be prevented from incorporating some or all of this patented technology into a *new* FDC? As Defendants pose the issue in their response:

> Construing the patents-in-suit to cover properly functioning FDCs in addition to defective FDCs is not only unsupported, it would conflict with the expressly

> stated purposes of the patents. The '414 patent provides a software device driver "solution" for computers with defective FDCs that avoids the cost of replacing the defective FDCs. Embedding the "solution" into the "microcode" of a non-defective FDC makes no sense in the context of the specification or the claims. The '002, '222 and '767 patents describe and claim ways to determine whether an FDC is defective. The '858 patent is directed to a technique for "welding" software to a defective FDC. None of these patents even hints at covering an apparatus or method related to a properly functioning FDC – nor the utility in doing so. Where all the figures show and the written specification consistently describes the apparatus and operation of the claimed invention as separate from – and operating with – a defective FDC, and the claims describe the invention as apparatus or method for detecting or correcting a defective FDC, it would be improper to construe the claims to cover code that is contained within a properly functioning FDC. (DRB 2)

And again, "Plaintiff also provides no rational explanation as to how, logically, a defective floppy diskette controller that cannot detect a data error can include the very apparatus that can detect the error that the FDC cannot detect" (DRB 18).

Plaintiff characterizes this rather circular argument as creating a paradox: "If an FDC is defective and cannot detect a last-byte error and a modification to the FDC makes it a non-defective FDC, then the defective FDC ceases to exist" (PRB 28). Fortunately, we need not stop to consider the "Through the Looking Glass" ramifications of this logical construct, for if there is one thing that Lewis Carroll (and Alice) taught us, it is that common sense usually prevails. The common sense of this situation goes like this: Plaintiff apparently accuses the Defendants of supplying and using redesigned FDCs that include some portion (or all) of some (or all) of the remedies claimed in the patents. Defendants argue that, despite that possibility (which of course they do not admit), the new FDCs are not "defective." "But why, oh why then," asks Alice, "do the new FDCs need to incorporate the remedy?" The obvious answer is that a new FDC may *become* defective, or *turn out to be* defective despite the redesign, or may encounter other problems that require detection, identification, and correction. There is accordingly absolutely no warrant for construing the claims of these patents in a way that would exclude redesigned FDCs

that nonetheless incorporate the claimed solutions. Once again, we are not here to construe the claims to cover, or not to cover, some accused infringing device or method. We are here to determine what the words of the claim mean to one of skill in the art.

Part C. Should any claim terms be limited to "software-only" solutions?

Although the asserted claims of the '414, '002, and '222 patents do not expressly recite such a limitation, Defendants insist that certain terms in each of those claims must be construed to require "software-only" solutions to the problems addressed by the claims. Thus, for the method steps numbered (6)-(10) of the '414 patent, Defendants contend that each is to be accomplished "by executing a software-only device driver which eliminates the need for hardware redesign and/or fabrication of new FDCs" (JS Ex. B at 10, 17, 19). Similarly, for the method steps numbered (11)-(19) of the '002 and '222 patents, Defendants argue that each is to be accomplished "by executing a software (programmatic) solution that may be implemented in a general purpose digital computer, which eliminates the need for visual inspection and identification of the defective FDCs as well as the need for any hardware recall and replacement" (JS Ex. B at 37).

The three patents in question contain several passages which Defendants believe support their contention[54]:

[54] Defendants also argue (DB 4-5) that the '767 and '858 patents represent "software-only" approaches to the problems addressed. They do not, however, contend that any claims of those patents should be so limited. They are forced to this position presumably because the claims of those patents do not invite reference to the quoted passages. In other words, there must be a textual reference in the actual language of the claim with which to associate a proffered claim construction. *Johnson Worldwide Assoc. Inc. v. Zebco Corp.,* 175 F.3d 985, 50 USPQ2d 1607, 1610–11 (Fed. Cir. 1999). A party wishing to use statements in the written description to confine or otherwise affect a patent's scope must, at the very least, point to a term or terms in the claim with which to draw in those statements. Without any claim term that is susceptible to clarification by the written description, there is no legitimate way to narrow the property right. If one need not rely on a limitation to interpret what the patentee meant by a particular term or phrase in a claim, that limitation is "extraneous" and cannot constrain the claim. *Renishaw plc v. Marposs Societa' per Azione,* 158 F.3d 1243, 48 USPQ2d 1117, 1121 (Fed. Cir. 1998). In the case of the '414, '002, and '222 patents Defendants have been at least colorably able to draw in the quoted passages by pointing to the functional claim terms "determining," "reading," "monitoring," etc. and arguing that those functions must be performed by "executing a software-only device driver."

This invention relates to the detection and recovery procedure of an undetected Floppy Diskette Controller ("FDC") data error where data corruption occurs and, more particularly, to novel systems and methods implemented as a software-only device driver which eliminates the need for hardware redesign and/or fabrication of new FDCs. (‘414 Patent C1L7-13)

It is also an object of the present invention to provide a software-only device driver which eliminates the need for hardware redesign and/or fabrication of new FDCs. (‘414 Patent, C5L8-10)

The invention described herein provides a complete software implementation of a device driver that is capable of detecting an undetectable data corruption problem without hardware redesign and/or internal modification to an existing FDC. (‘414 Patent, C19L36-40)

The number of FDCs installed in computer systems today is well over 20 million. In order to solve this problem the vendors of such devices have very few alternatives, of which most are extremely costly. Therefore, a software-only solution to this problem is a significant advance in the computer industry. (‘414 Patent, C19L47-52)

This invention relates to the detection of defective Floppy Diskette Controllers ("FDCs") where an undetected data error causes data corruption and, more particularly, to novel systems and methods implemented as a software-only detection mechanism which eliminates the need for visual inspection or identification of the FDCs.” (‘002 Patent, C1L8-13; ‘222 Patent, C1L14-19)

It is another object of the present invention to provide a software (programmatic) solution that may be implemented in a general purpose digital computer, which eliminates the need for visual inspection and identification of the defective FDCs as well as the need for internal modification to an existing FDC. (‘002 Patent, C4L17-22; ‘222 Patent, C4L28-33)

The invention described heretofore provides detection solution that may be completely implemented in software as a device driver 29b that is capable of detecting defective FDCs 20 without visual inspection and identification of the FDCs. (‘002 Patent, C12L45-49; ‘222 Patent, C13L1-5)

In order to identify defective FDCs vendors and consumers which have defective FDCs 20 installed have very few alternatives (e.g. recalls; replacement), of which most are extremely costly, for determining whether or not their systems are susceptible to the data corruption presented by defective FDCs 20. Therefore, an apparatus and method that may be implemented as a software-only solution to this problem is a significant advance in the computer industry. (‘002 Patent, C12L60-C13L1; ‘222 Patent, C13L17-25)

At first glance, these passages would appear to provide some support for Defendants' "software-only" contention, for they emphasize a software-only solution. But it is important to read the passages carefully, in light of the patents as a whole, including particularly the claims. When this is done, it becomes apparent that the feature of the invention that was being touted was that detection of defective FDCs and prevention of FDC data transfer errors could now be accomplished without necessitating "hardware redesign and/or fabrication of new FDCs" or "internal modification to an existing FDC" or "visual inspection or identification of the FDCs" or "recalls" or "replacement." Those solutions were, at least in the view of the inventor, expensive and inconvenient and the goal was to avoid them by other means. The inventor was clearly using the terms "software-only" and "software (programmatic) solution" in contradistinction to solutions that required the recall, replacement, modification, or visual inspection or identification of an FDC already in place in a computer system. Whether or not those solutions are accomplished *solely* by software, or by a combination of software and hardware (as is the case with most computer functions[55]) is immaterial and certainly cannot be interposed as a limitation on the various functional steps recited in the '414, '002, and '222 patents.

This is not to say, however, that those claims are not affected in any way by the quoted passages. It is impossible to read the three patents in question and come away without the distinct impression that what the inventor had come up with was a way to identify defective FDCs and prevent the errors they might cause *without having to replace, modify, or inspect them.* Indeed, several of the quoted passages refer to this achievement as "the invention" or "the present invention." The Federal Circuit holds that "[w]hen a patent thus describes the features of

[55] See note 68 and associated text.

the 'present invention' as a whole, this description limits the scope of the invention."[56] It would accordingly be improper to fail to impose this limitation upon certain of the asserted claims of the three patents.[57] In keeping with the requirement for a term or phrase in the claims with which to draw in this limitation, we need look no further than the preambles of the asserted independent claims. **Accordingly, it is recommended that the preamble of claim 1 of the '414 patent be construed to require that the method for detecting and preventing FDC data transfer errors be accomplished without the need to replace, modify, or visually inspect the FDC; that the preamble of claims 1 and 15 of the '002 patent and claim 1 of the '222 patent be construed to require apparatus for detecting a defective FDC without the need to replace, modify, or visually inspect the FDC; that the preamble of claim 12 of the '002 patent be construed to require that the method for detecting an underrun error be accomplished without the need to replace, modify, or visually inspect the FDC; and that the preamble of claim 13 of the '222 patent be construed to require that the method for testing controllers be accomplished without the need to replace, modify, or visually inspect the controller.** As has been explained in Part B, however, this does not mean that a redesigned FDC that incorporates the claimed solutions of the asserted patent claims falls outside the scope of the claims.

Two of the asserted independent claims, claim 11 of the '002 patent and claim 12 of the '222 patent, cannot be construed to require the "without the need to replace, modify, or visually inspect the FDC" limitation. Neither claim recites a "defective" FDC, and neither contains

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[56] *Verizon Servs. Corp. v. Vonage Holdings Corp.*, 503 F.3d 1295, 84 USPQ2d 1609, 1618 (Fed. Cir. 2007). See also, e.g., *TiVo Inc. v. Echostar Comm. Corp.*, 516 F.3d 1290, 85 USPQ2d 1801, 1808 (Fed. Cir. 2008); *Honeywell Int'l Inc. v. ITT Indus. Inc.,* 452 F.3d 1312, 79 USPQ2d 1294, 1299-1300 (Fed. Cir. 2006); *Microsoft Corp. v. Multi-Tech Sys. Inc.,* 357 F.3d 1340, 69 USPQ2d 1815, 1820-22 (Fed. Cir. 2004).

[57] Indeed, the '002 and '222 are "detector" patents (PB 8) and it would be illogical to interpret their claims so broadly that FDC replacement, modification, or inspection could be part of the detection process.

language that invites reference to the passages from those patents that are quoted above. Without a claim term (such as "defective FDC") that could be used to draw in that extraneous limitation, it would be improper to import the limitation into the claims. These claims simply recite "an underrun error not detected by the" FDC, and it would be a grotesque distortion of the English language to engraft a positive prohibition of replacement, modification, or visual inspection onto that recital.

Part D. Remaining recommended constructions

Presumptive Means-Plus-Function Terms

The two apparatus terms discussed in this section clearly invoke the presumption of MPF treatment because they recite the tell-tale "means for" language followed by a recitation of function. Defendants contend that they are indeed MPF elements (JS Ex. B at 9-10). Plaintiff goes both ways, offering both a "standard" definition and a MPF definition (JS Ex. A1 at 21-22, 31), although in its briefing it appears to have abandoned the "standard" definition as an alternative (PB 24-28).

(1) means associated with the FDC for providing a data request (DREQ) signal and a data acknowledge (DACK) signal, the DREQ signal being provided when data transfer is requested and the DACK signal being provided when data transfer is permitted ('414 patent)

Defendants' position on this limitation is that it must be construed in accordance with 35 U.S.C. §112¶6, and that it is indefinite "because the specification does not disclose or clearly link any means associated with the FDC that provides both the DREQ and DACK signals" (JS Ex. B at 9-10). Defendants' argument is based upon the legal proposition that a holding that a claim containing a MPF limitation lacks a disclosure of structure in the patent specification that performs the claimed function necessarily means that the court finds the claim in question indefinite, and thus invalid. But because the claims of a patent are afforded a statutory

presumption of validity, a challenge to a claim containing a MPF limitation as lacking structural support requires a finding, by clear and convincing evidence, that the specification lacks disclosure of structure sufficient to be understood by one skilled in the art as being adequate to perform the recited function.[58] As we have already seen, a structure disclosed in the specification is deemed to be "corresponding structure" only if the specification clearly links or associates that structure to the function recited in the claim.[59]

Plaintiff, as indicated, now appears to agree that this element is one that must be analyzed in accordance with §112¶6. Plaintiff offers examples of structure that it says is associated with the FDC and will perform the recited function of "providing a data request (DREQ) signal and a data acknowledge (DACK) signal" (JS Ex. A1 at 22ff.).

There is no doubt that this claim element is expressed in classic MPF format and has to be construed in accordance with §112¶6. The functional statement neither recites nor implies any structure whatever. The words appended directly to "means" – "associated with the FDC" – are neither structural nor functional; rather, they are relational. Accordingly, the first step in the §112¶6 analysis is to determine what the function is and the second is to identify the corresponding structure in the written description that performs that function. Function must be determined before corresponding structure can be identified.[60]

Plainly, the recited function is "providing a data request (DREQ) signal and a data acknowledge (DACK) signal, the DREQ signal being provided when data transfer is requested and the DACK signal being provided when data transfer is permitted." Unlike some functional clauses in MPF claims,[61] this one requires no construction in and of itself; the acronyms DREQ

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[58] *Budde v. Harley-Davidson Inc.,* 250 F.3d 1369, 58 USPQ2d 1801, 1806 (Fed. Cir. 2001).
[59] See notes 30-31 and accompanying text.
[60] *JVW Enter. Inc. v. Interact Access. Inc.,* 424 F.3d 1324, 76 USPQ2d 1641, 1645 (Fed. Cir. 2005).
[61] See, e.g., *Cardiac Pacemakers Inc. v. St. Jude Med. Inc.,* 296 F.3d 1106, 63 USPQ2d 1725, 1730 (Fed. Cir. 2002).

and DACK are actually defined in the claim language itself and the remainder of the words can be understood by reference to their ordinary meanings. Thus, the remaining task is to determine whether the inventor, in the written description of the '414 patent, has disclosed structure to perform that function and clearly linked the structure to the function.

The SM has searched the '414 patent in vain for some clear identification of structure that corresponds to the claimed means for providing the claimed function. Plaintiff simply throws in everything, including the kitchen sink:

> The structure that realizes the request/acknowledge or request/grant feature of a computing system is the computing system's architecture. (See Fig. 1, Col. 6, lines 20-21). Each component (CPU, System Bus, FDC, DMA Controller, etc) in a particular computing system must conform to the implementation rules of the computing system architecture. Therefore, each of the previously mentioned components are capable, and must, perform data transfers in compliance with the computing system's architectural rules, e.g., data request (DREQ) and data acknowledge (DACK). (PB 25-26)

Now it may well be that an *alleged* corresponding structure is definitely capable of performing the function recited in the MPF limitation. But this is insufficient where is no clear link or association between the disclosed structure and the function recited in the MPF limitation.[62] It bears repeating that unless structures are clearly associated with the claimed function, they cannot be corresponding structures for purposes of §112¶6. Although expert testimony and declarations are useful to confirm that a construed meaning is consistent with the denotation ascribed by those in the field of the art, such extrinsic evidence cannot be used to clearly link the

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[62] *Medtronic Inc. v. Advanced Card. Sys. Inc.,* 248 F.3d 1303, 58 USPQ2d 1607, 1614 (Fed. Cir. 2001). Indeed, to adopt Plaintiff's position in this respect would be directly contrary to *Biomedino LLC v. Waters Tech.,* 490 F.3d 946, 83 USPQ2d 1118 (Fed. Cir. 2007), in which the court addressed this question: "is sufficient corresponding structure disclosed when the specification simply recites that a claimed function can be performed by known methods or using known equipment where prior art of record and the testimony of experts suggest that known methods and equipment exist?" In answering in the negative, the court observed that the inquiry is whether one of skill in the art would understand the specification itself to disclose a structure, not simply whether that person would be capable of implementing a structure. Accordingly, a bare statement that known techniques or methods can be used does not disclose structure. To conclude otherwise would vitiate the language of the statute requiring "corresponding structure, material, or acts described in the specification."

claimed function with allegedly corresponding structure.[63] Here Plaintiff can point to nothing – not intrinsic evidence in the patent documents and not extrinsic evidence – with which to link disclosed structure to claimed function. Plaintiff offers only pure attorney argument that "[t]he structure that realizes the request/acknowledge or request/grant feature of a computing system is the computing system's architecture" (PB 25). This is insufficient.

For a court to hold that a claim containing a MPF limitation lacks a disclosure of structure in the patent specification that performs the claimed function necessarily means that the court finds the claim in question indefinite, and thus invalid. Because the claims of a patent are afforded a statutory presumption of validity, a challenge to a claim containing a MPF limitation as lacking structural support requires a finding, by clear and convincing evidence, that the specification lacks disclosure of structure sufficient to be understood by a person of ordinary skill in the art as being adequate to perform the recited function.[64] The SM finds, based upon the clear and convincing evidence discussed above, that this MPF clause in claim 1 of the '414 patent lacks a corresponding disclosure, in the patent specification, of structure that performs the recited function, because the specification does not clearly link any structure to the performance of that function. Plaintiff vigorously urges that any *a fortiori* recommendation as to invalidity for indefiniteness under 35 U.S.C. §112¶2 is "premature" because it would "evade a full-blown validity analysis (with all the procedural safeguards of Rule 56 of the Federal Rules of Civil Procedure) by raising the specter of invalidity during the claim construction phase" (PB 19). But this argument appears to ignore the rule that a "determination of claim indefiniteness is a legal conclusion that is drawn from the court's performance of its duty as the construer of patent

[63] *Omega Eng'g Inc. v. Raytek Corp*., 334 F.3d 1314, 67 USPQ2d 1321, 1334 (Fed. Cir. 2003).
[64] *Budde v. Harley-Davidson Inc.*, 250 F.3d 1369, 58 USPQ2d 1801, 1806 (Fed. Cir. 2001).

claims."[65] Moreover, it is not part of the SM's assignment at this point to grant summary judgment of invalidity for indefiniteness; the assignment is claim construction, pure and simple. As a part of that assignment, the SM **recommends that the Court conclude that this MPF clause in claim 1 of the '414 patent is not clearly linked to a corresponding disclosure, in the patent specification, of structure that performs the recited function and therefore cannot be construed.**

(2) **means for counting data bytes transferred to the floppy diskette, said counting means providing a data transfer byte count ('414 patent)**

Again, Defendants argue that this is a MPF limitation and cannot be construed "because the specification does not disclose or clearly link means for counting data bytes transferred to the floppy diskette," thus rendering the limitation indefinite and the claim invalid (JS Ex. B at 10). Plaintiff again poses a standard definition ("A functional unit providing a hardware and/or software counter") and an alternative MPF analysis that provides examples of structure that it says will perform the recited function of "counting data bytes transferred to the floppy diskette" (JS Ex. A1 at 30). In its briefing, however, it abandons the alternative standard definition and argues only MPF issues (PB 27). The SM agrees with the parties that this clause is in MPF format and requires §112¶6 analysis. It neither recites nor implies structure in addition to the "means."

Again, the functions are straightforwardly recited in the claim and needs no construction of their own: "counting data bytes transferred to the floppy diskette" and "providing a data transfer byte count." Thus the question, does the '414 specification clearly link any structure to these functions? Plaintiff again speaks in gross generalities:

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[65] *Personalized Media Comm. LLC v. United States ITC,* 161 F.3d 696, 48 USPQ2d 1880, 1888 (Fed. Cir. 1998).

> As noted above, each of the aforementioned components [Plaintiff mentions several possibilities: "Processors, I/O controllers (FDCs, DMA Controllers, etc.) and System Buses"] provide counters and counting ability. For example, the processor employs internal registers or memory locations as counters. The processor simply adds to or subtracts from the specified register or memory location that is used as a counter. The FDC is an I/O controller that controls data transfer to and from floppy diskettes and/or compatible storage media. FDC commands dictate the number of bytes to be transferred. Therefore, the FDC maintains an internal counter of the number of bytes thus transferred. Furthermore, FDC commands actually return counts from FDC internal counters to indicate the actual number of bytes and/or sectors transferred. The DMA controller is an I/O controller like the FDC. DMA controller commands dictate the number of bytes to be transferred. Therefore, the DMA controller maintains an internal counter of the number of bytes thus transferred. (Fig. 4) Most DMA controllers provide commands to determine the current number of bytes transferred and/or remaining to be transferred, as indicated in the DMA controller's internal counter. (Col. 8, lines 9-13). Finally, most system buses maintain internal counters to determine the amount of time, in terms of the number of clock pulses (bus cycles), a particular bus operation requires. For example, a read operation may take 10 bus cycles while a write operation may require 15 bus cycles. It is, therefore, important that the system bus maintain an internal counter to determine that proper operation is maintained on each type of system bus operation. (PB 27-28)

This time, however, as Defendants helpfully point out (DB 15), the '414 patent itself is more specific and, indeed, clearly links one particular structure to the counting function. Claim 3 (not asserted) is dependent upon claim 1 and adds the limitation "wherein said means for counting data bytes comprises a data transfer count register of a direct memory access (DMA) controller." This is a clear and unmistakable linkage of the "means" clause to structure that includes a data count register of a DMA controller.

At the September 24 hearing, Defendants offered a novel legal theory that they say should inhibit reliance upon the added limitation of claim 3 as a statement linking structure to function. Basically, their argument goes like this: The patent code, in 35 U.S.C. §132, says that "no amendment shall introduce new matter into the disclosure of the invention." They contend that the added limitation in claim 3, which was added by an amendment nearly two years after

the '414 application was filed, constituted "new matter" within the meaning of §132. Accordingly, they urge, it would be improper to rely upon claim 3 to supply the missing link. This argument is unavailing. In the first place, even if it be assumed that the language in question is new matter, and therefore improperly present in claim 3, Defendants cite no case (and the SM is aware of none) that holds that it is improper to reply upon language actually present in a patent, whether or not it is properly present, to construe the patent's claims. At first blush, this strikes the SM as a bit of a reach, for it would tend to impair the notice function of an issued patent; competitors would not only have to evaluate the intrinsic evidence, but they would have to make a judgment as to whether that evidence actually belonged in the patent or not. In the second place (and much more importantly, in the eyes of the SM), there is a rule that when the PTO allows an amendment without objection on grounds of new matter, the patent is entitled to an especially weighty presumption that the PTO acted correctly.[66] Defendants have made no effort, much less one supported by clear and convincing evidence, to overcome this presumption.

Accordingly, it is recommended that the "means" of this clause be interpreted to cover a data transfer count register of a direct memory access (DMA) controller and equivalents thereof capable of counting data bytes transferred to the floppy diskette and providing a data transfer byte count.

Non-presumptive Potential Means-Plus-Function Terms

The three apparatus terms discussed in this section do not invoke the presumption of MPF treatment because they lack the tell-tale "means for" signal. Nonetheless, they recite an element that is required to perform a function; the element is simply recited by a term without

[66] *Brooktree Corp. v. Advanced Micro Devices Inc.,* 977 F.2d 1555, 24 USPQ2d 1401, 1414 (Fed. Cir. 1992). This may well account for the fact that, as far as is known to the SM, no modern decision has ever invalidated a patent as a result of a direct "new matter" challenge under §132.

any apparent supporting structure. Thus, the fundamental question here was aptly framed by the Federal Circuit in this way:

> In considering whether a claim term recites sufficient structure to avoid application of section 112 ¶ 6, we have not required the claim term to denote a specific structure. Instead, we have held that it is sufficient if the claim term is used in common parlance or by persons of skill in the pertinent art to designate structure, even if the term covers a broad class of structures and even if the term identifies the structures by their function.[67]

Defendants apparently do not contend that these limitations call for MPF treatment (JS Ex. B at 1, 47, 53). Plaintiff agrees (JS Ex. A1 at 1, Ex. A4 at 1, 6).

(3) **a floppy diskette controller (FDC) for controlling the transfer of data to the floppy diskette ('414 patent)**

This claim element does not contain any explicit recitation of structure, only a term ("floppy diskette controller") and an associated function. Thus, unless the very term itself evokes structure to one of ordinary skill in the art, the presumption of no-MPF treatment would be overcome. However, the intrinsic evidence has satisfied the SM that such persons would, as of 1992, have understood that an FDC had a characteristic structure. The '414 patent gives examples of commercial FDCs that exhibit the defect addressed by the patent ('414 C1L50-54) and points out that such devices were being shipped more than 10 years prior to 1992 ('414 C3L64-65). It estimates an installed base of some 25 million such FDCs as of 1992 ('414 C4L10-12). In the absence of any contrary evidence, this alone convinces the SM that the very term "floppy diskette controller" has implicit structural connotations to remove this element from the ambit of MPF treatment.

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[67] *Lighting World Inc. v. Birchwood Lighting Inc.,* 382 F.3d 1354, 72 USPQ2d 1344, 1348 (Fed. Cir. 2004). It is appropriate to refer to the accompanying functional language in order to determine whether the term in question connotes sufficient structure to one of ordinary skill in the art to avoid §112 ¶6 treatment. E.g., *Massachusetts Inst. of Tech. v. Abacus Software,* 462 F.3d 1344, 80 USPQ2d 1225, 1232–33 (Fed. Cir. 2006).

Defendants' proposed construction is a "hardware device that interfaces the computer's CPU with the floppy diskette drive for controlling transfer of data to and from a floppy diskette" (JS Ex. B at 1). Plaintiff says it is an "I/O controller that controls and/or manages a floppy diskette drive" (JS Ex. A1 at 1).

Plaintiff's proposal suffers from the addition of terms, such as "I/O" and "controls and/or manages" that would in themselves require construction. In addition, it ignores the "floppy diskette" limitation itself. Defendants' version adds the needless and probably inaccurate limitation to a "hardware device." Although those skilled in the art would likely think of an FDC as hardware, its function, like most in any computer system, is implemented by a combination of hardware and software. If Defendants, by their reference to hardware, propose to limit the device to "hardware-only," they are overreaching, particularly in the field of computer technology. As the Federal Circuit has observed:

> Moreover, as the district court pointed out, process and product – software and hardware – are practically interchangeable in the field of computer technology. *Eolas Techs., Inc. v. Microsoft Corp*., 274 F. Supp. 2d 972, 974 (N.D. Ill. 2003). On a functioning computer, software morphs into hardware and vice versa at the touch of a button. In other words, software converts its functioning code into hardware and vice versa.[68]

It is recommended that an FDC, as it appears in claim 1 of the '414 patent, be construed to mean a **device that interfaces the computer's "CPU" (as that term is construed in this report) with the floppy diskette drive for controlling transfer of data to and from a "floppy diskette" (as that term is construed in this report). The usage of FDC in the various asserted claims of the other patents in suit likewise is not limited to hardware-only devices.**

(4) **a determination module for identifying a hardware resource associated with a computer system ('858 patent)**

[68] *Eolas Techs. Inc. v. Microsoft Corp*., 399 F.3d 1325, 73 USPQ2d 1782, 1794 (Fed. Cir. 2005).

(5) **a welding module for inseparably connecting a persistent software layer to the hardware resource ('858 patent)**

These terms appear to have been coined by the inventor for purposes of describing the invention of the '858 patent. There is no evidence that the terms "determination module" and "welding module" had, as of May 2000, any well-understood meaning in this art that one of skill would associate with particular software structure (or hardware structure, for that matter) that would accomplish the respective recited functions of "identifying a hardware resource associated with a computer system" and "inseparably connecting a persistent software layer to the hardware resource." Indeed, it is likely that there are many ways that those functions could be accomplished through the use of appropriate software modules. Accordingly, the SM has concluded that the presumption of no MPF treatment has been overcome, and that the elements must be construed in accordance with 35 U.S.C. §112¶6. The "standard" definitions offered by the parties confirm this conclusion. Defendants say that the "determination module" is an "application program executing outside of the FDC that determines the model or capabilities of a hardware device" (JS Ex. B at 47) and that the "welding module" is an "application program executing outside of the FDC using debug registers to insert another application program between a hardware resource and its device driver" (JS Ex. B at 53). Plaintiffs says that the "determination module" is a "subassembly or program unit that identifies a piece of hardware associated with a computer system" (JS Ex. A4 at 1) and the "welding module" is a "subassembly or program unit associating, in a nonremovable way, a software layer with a hardware unit" (JS Ex. A4 at 6). In essence (aside from Defendants' gratuitous insertion of the complicating terms "application" and "outside of the FDC"), these proposals simply say that the recited modules constitute software that, when executed, performs the recited functions. But neither these proposals nor the actual language of the claim say anything at all about the

structure of that software. Thus, to sidestep §112¶6 treatment would be to allow the claim language to cover every possible software structure that would provide those functions. This is precisely what §112¶6 was designed to prevent.[69]

It is therefore necessary to examine the '858 specification to determine whether it discloses specific software structure for providing the recited functions and, if so, whether it clearly links the structure to the performance of the functions. The '858 patent contains these pertinent statements:

> In certain embodiments, an apparatus for detecting a defective floppy diskette controller may comprise a computer readable medium storing executable and operational data structures. The data structures may include a determination module for identifying a hardware resource associated with a computer system, a welding module for inseparably connecting a persistent software layer to the hardware resource, and a defense module for resisting attempts by other software to unweld the persistent software layer from the hardware resource. (C5L42-51)
>
> FIG. 8 is a schematic block diagram of a method for welding a software layer to a hardware layer in accordance with the invention. (C7L40-42)
>
> Referring to FIG. 8 specifically and FIGS. 8-15 generally, an overview at a high level of abstraction shows an overarching process for implementing a welding process. A process 150 may include a determination 151 of available 25 hardware and support in a computer system. Accordingly a welding process 153 may weld a software layer to a hardware layer such that other software cannot defeat the connection therebetween. (C15L22-29)

Then there follows a fairly detailed description of the structure and operation of the software modules represented schematically in Fig. 8:

> Referring to FIG. 8 to review in more detail a specific embodiment for implementing a software correction of a hardware state, a process 150 in accordance with the invention may address FDC controllers that are configured to operate with a first-in-first-out (FIFO) architecture. In such an embodiment, a process 152 for loading 152 a driver for a hardware resource (e.g. peripheral device) leads to identifying 154 the processor executing the instructions. Thereafter, a test 156 determines whether or not the processor is a Pentium (P5) type or equivalent, or not. If the device is not, then a do-not-install step 158 is initiated. The step 158 is one of two similar actions.

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[69] See *Johnston v. IVAC Corp.*, 885 F.2d 1574, 12 USPQ2d 1382, 1386 (Fed. Cir. 1989).

> By contrast, if the test 156 results in a device that is at least as current, or more current than a P5 architecture, then identifying 160 the floppy diskette controller is useful. The identifying step 160 corresponds to a floppy diskette controller, which may control more than floppy diskette types of media. After identifying 160 the nature of the floppy diskette controller (FDC), a test 162 determines whether or not the FDC operates with FIFO enablement. If not, then a do-not-install step 164 follows.
>
> Otherwise, for FIFO-enabled FDCs, a save step 166 saves the content from a control register no.4 (CR4). Next, the bit assigned to the CR4.DE location is set 168. By the setting 168, the save step 166 is effectively required. Otherwise, the setting step 168 destroys irretrievably the contents of the CR4, control register no. 4, contents.
>
> A saving step 170 saves to another location the contents of the debug register no. 7 (DR7). The saving step 170 may also save debug register no. 3 (DR3). Saving 172 an original interrupt service routine, associated with a first interrupt, then provides installation 174 of a new or alternative interrupt service routine (ISR).
>
> In the installing step 174, a setting step 176 may set the FIFO to an "on" state if executing a solution to the read/write defect of an FDC. The solution represents a curing of the hardware defect of the chip by operating the software solution as described above. Alternatively, setting 178 the FIFO to an "off" state is used for the detection process. The detection process is the determination of whether or not the subject chip has the hardware defect detected and solved by the instant invention. (C15L43-C16L17)

These passages describe, in terms that would be understandable to a person of ordinary skill in this art, software structure capable of performing the recited "determining" and "welding" functions, and clearly link that structure to those functions.

Accordingly, it is recommended that these two MPF clauses be construed to cover the software structure that is described in the passages quoted above, and equivalents thereof. Neither requires that the module be executed outside the FDC (see Part B).

Non-presumptive Potential Step-Plus-Function Terms

There are many steps recited in the asserted method claims of the patents in suit. Some of them – terms 6-10 of the '414 patent and terms 12-14 of the '002 patent – are expressly designated as "steps of." Others – terms 17-19 of the '222 patent and terms 20-22 of the '767 patent – do not use the "step" language but nonetheless are expressed in participle form without

much, if anything, by way of additional recitation of supporting acts. None of these terms invokes the presumption of SPF treatment, inasmuch as they do not employ the presumption-triggering signal "step for." Nonetheless, it must be determined whether the language of the claimed method steps is such as to overcome the converse presumption. This analysis must be approached with a caution proportionate to the understanding that the Federal Circuit apparently has never applied §112¶6 to a method limitation. But the analysis must be made, because claim construction is an obligation of the court that is independent of the views asserted by the adversary parties.[70] When the construer of claim believes, as does the SM in this case, that SPF limitations are potentially in issue, there seems to be no way to avoid the analysis.

Federal Circuit case law dealing with SPF limitations is, with all respect, far from clear. On the one hand we are told that, absent recital of a function, a step is not to be construed under §112¶6, even where the steps are "described by an 'ing' verb, such as passing, heating, reacting, transferring, etc.[71] On the other hand, we are told that the issue is whether the step sets forth an "act" – that is, whether it describes "how" the function is accomplished rather than simply "what" the step accomplishes.[72] It is difficult to know just how to apply these tests. For example, consider the step, in claim 1 of the '414 patent, of "forcing an error condition." On the one hand, no actual "function" is specified other than the act of "forcing." But on the other hand, there are many ways to force an error condition and the claim says nothing about how it is to be done. Which test to apply – or, rather, which should prevail – is a real puzzle.

Under circumstances like this, it would seem that searching for cases "on-all-fours" might be the prudent course. Although there are precious few SPF decisions in the jurisprudence

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[70] *Exxon Chem. Patents Inc. v. Lubrizol Corp.,* 64 F.3d 1553, 35 USPQ 1801, 1802 (Fed. Cir. 1995).
[71] *O.I. Corp. v. Tekmar Co.,* 115 F.3d 1576, 42 USPQ2d 1777, 1782 (Fed. Cir. 1997).
[72] See *Seal-Flex Inc. v. Athletic Track & Court Constr.*, 172 F.3d 836, 50 USPQ2d 1225, 1233 (Fed. Cir. 1999) (Rader, J. concurring), cited with approval in *Masco Corp. v. United States,* 303 F.3d 1316, 64 USPQ2d 1182, 1189 (Fed. Cir. 2002).

of the Federal Circuit, a very small handful seem to be pertinent. Note that the first potential SPF element of claim 1 of the '414 patent is "determining if a requested computer system operation is a floppy diskette write operation." In one case, the method step recited "determining at least the last-dialed number of the telephone number dialed on the telephone." This was held not to be a SPF limitation "because it does not recite a function. * * * Rather, it recites only the act of determining a last-dialed digit.[73] In another case, the limitation "determining a condition of the heart from among a plurality of conditions of the heart" was held not to be subject to §112¶6 treatment.[74]

Another fortuitous example pertains to one of the terms of claim 12 of the '002 patent: "delaying a transfer of a byte, corresponding to the writing step, for a time selected to cause an under run error." In yet another Federal Circuit case the claim limitation was "transmitting a force to drive" a lever. The court held that this was not a SPF limitation, because "transmitting a force" was an act that performed the driving function.[75] By the same token, "delaying a transfer of a byte" would be regarded as an act that performed the function of causing an under run error.

Applying the teachings of these specific cases to the following claims terms has led the SM to conclude that the Federal Circuit would likely not regard any of them as SPF limitations subject to treatment under §112¶6. However, "removal of a clause from §112¶6 does not automatically convert it into an open-ended step without limits. A claim limitation is always construed in light of the specification, whatever the form of the claim."[76]

(6) **determining ('414 patent)**

(7) **reading ('414 patent)**

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[73] *Serrano v. Telular Corp.,* 111 F.3d 1578, 42 USPQ2d 1538, 1542 (Fed. Cir. 1997).
[74] *Cardiac Pacemakers Inc. v. St. Jude Med. Inc.,* 381 F.3d 1371, 72 USPQ2d 1333, 1341 (Fed. Cir. 2004).
[75] *Masco Corp. v. United States,* 303 F.3d 1316, 64 USPQ2d 1182, 1188-89 (Fed. Cir. 2002).
[76] *Cardiac Pacemakers Inc. v. St. Jude Med. Inc.,* 381 F.3d 1371, 72 USPQ2d 1333, 1341-42 (Fed. Cir. 2004).

(8) **monitoring ('414 patent)**

(9) **measuring ('414 patent)**

These four terms can be conveniently analyzed together. Defendants do not appear to be suggesting that the individual words, common English language words that describe actions, themselves require construction. Rather, they urge that a specific qualifier be engrafted onto each of the terms: "by executing a software-only device driver which eliminates the need for hardware redesign and/or fabrication of new FDCs" (JS Ex. B at 10, 17). Plaintiff takes the position that the terms should have their plain, ordinary meanings; it simply suggests synonyms: "determining" means "to ascertain;" "reading" the byte count means "to acquire data" regarding the count; "monitoring" transfers means "to observe" them; and "measuring" time means "to determine the size or duration of" time. (JS Ex. A1 at 41, 46, 52, 58).

With respect to Plaintiff's offerings, it is well to repeat again the admonition of the Federal Circuit that "claim construction is not an obligatory exercise in redundancy," and that it is unnecessary to repeat or restate every claim term in order to comply with the Markman directive that claim construction is a matter for the court.[77] A reasonable juror might well wonder why, for example, if measuring time means determining the size or duration of time, the patentee did not use the latter phrase instead. Obviously these words need no construction, other than perhaps in the form of an instruction that makes it clear to the jury that the computer system – not a person – is doing the determining, reading, monitoring, and measuring.

The real issue here, of course, is Defendants' insistence upon its proposed extraneous language. Defendants' contention about a "software-only" device driver has already been addressed in Part C above. They also contend, with respect to the "measuring" step (9), that it requires measuring "the time interval between the presence of the DREQ signal associated with

[77] *United States Surgical Corp. v. Ethicon, Inc.*, 103 F.3d 1554, 41 USPQ2d 1225, 1236 (Fed. Cir. 1997).

the last byte of a sector and the presence of the DACK signal" (JS Ex. B at 17). But there does not appear to be any useful purpose served by inserting the term "the presence of" before each of the signals. That is not what the claim says (it simply says "measuring time between the data request (DREQ) and data acknowledge (DACK) signals"), and there is nothing in the intrinsic evidence[78] that calls for or even supports that addition. When claim 1 is read as a whole, in light of the specification, it is clear that it contemplates a situation where the system will "time out" prior to the occurrence of the DACK signal if the measured time exceeds a specified value. Thus, the claim cannot be read to require measurement of the entire time between the presence of a DREQ signal and the presence of a DACK signal.

Accordingly, given the preamble construction of claim 1 recommended in Part C, these method steps of the '414 patent require no construction; their ordinary meanings are clear.

(10) **forcing ('414 patent)**

Here again Defendants are apparently not troubled by the term "forcing;" but they wish to have the following extraneous matter engrafted onto it: "generating, by executing a software only device driver which eliminates the need for hardware redesign and/or fabrication of new FDCs, an error signal not produced by the floppy diskette controller" (JS Ex. B at 19). As can be seen, this proposal would add, in addition to the "software-only" limitation discussed and rejected in Part C, a limitation on how – indeed, where – the error signal is produced. Plaintiff, as before, simply offers another set of synonyms: "forcing" an error signal means "to coerce or compel" it (JS Ex. A1 at 64). And again, the SM declines the opportunity to produce a mini-thesaurus on

[78] Defendants urge (DB 10-11) that the prosecution history of the '414 patent supports their position. In the transaction to which they point, the inventor amended claim 1 in several respects. In particular, the method step in question, which originally required "timing" the DREQ "to" DRAK signals, was amended to require "measuring the time between" the DREQ and DRAK signals. But the examiner, in an action dated June 10, 1994, deleted "the" after "measuring", so that the claim term reads "measuring time." This supports Plaintiff's position, not Defendants'.

ordinary English language words describing actions; a jury will have no difficulty in understanding what it means for a computer system to "force" an error signal, so long as they are not required to understand how it is done. The real issue here, then, is whether Defendants' proposed extraneous language is justified.

The "software-only" kicker has already been disposed of, so it is only necessary to evaluate Defendants' proposal of "an error signal not produced by the" FDC. Defendants argue that "[b]ecause these FDCs cannot generate an error condition for that error, software outside the FDC must do so" (DB 11).[79] But this is nothing more than a rehearsal of their argument, rejected in Part B above, that certain structure and functions must be located and accomplished outside the FDC.

Accordingly, given the preamble construction of claim 1 recommended in Part C, this method step of the '414 patent requires no construction; its ordinary meaning is clear.

(11) **writing ('002 & 222 patents)**

(12) **interrupting ('002 patent)**

(13) **delaying ('002 & '222 patents)**

(14) **completing ('002 patent)**

(15) **verifying ('002 & '222 patents)**

(16) **reading ('002 & '222 patents)**

(17) **increasing ('222 patent)**

(18) **causing ('222 patent)**

(19) **detecting ('222 patent)**

[79] Defendants also point to a reference in the specification (DB 11-12), but their argument in that respect appears to have no point.

As in the case of the similar functional terms in claim 1 of the '414 patent, these various terms appearing in the asserted claims of the '002 and '222 patents can be analyzed together. Again, Defendants do not offer synonyms for these common English language words that describe actions. Instead, Defendants contend that those actions must be accomplished "by executing a software (programmatic) solution that may be implemented in a general purpose digital computer, which eliminates the need for visual inspection and identification of the defective FDCs as well as the need for any hardware recall and replacement" (JS Ex. B at 37). And again Plaintiff offers up an unhelpful thesaurus of synonyms: "writing" is storing digital data; "interrupting" means to stop or hinder by breaking in; "delaying" means postponing; "completing" means finishing; "verifying" means confirming; "reading" means to acquire data; "increasing" means to make greater; "causing" means to make happen; and "detecting" means to discover or determine (JS Ex. A2 at 54, 60, 67, 74, 80, 87, 93, 99, 104). These proposed alternatives are not useful; a juror would be just as likely (if not more likely) to understand the actual language used in the asserted claims.

Defendants' position on these steps has already been addressed in Part C above. **Accordingly, given the preamble constructions of claims of claims 1 and 15 of the '002 patent and claims 1 and 13 of the '222 patent recommended in Part C, these terms require no construction; their ordinary meanings are clear.**

(20) **writing ('767 patent)**

(21) **identifying ('767 patent)**

(22) **scanning ('767 patent)**

These functional terms appear as the method steps of claim 12 of the '767 patent. Neither side in this case appears to contest their meanings. For many of the reasons set forth in

connections with elements (6)-(19) above, **the SM has concluded that their ordinary meanings are abundantly clear and that they accordingly need no further construction.**

Other Claim Terms

(23) **central processing unit (CPU) ('414 patent)**

See Part B above.

(24) **system interrupt timer ('414 patent)**

Defendants propose this definition: "timing device that generates interrupts to the CPU at specified intervals" (JS Ex. B at 8); Plaintiff: "A reference source of timing information that may interrupt" (JS A1 at 17). The specification of the '414 patent does not use this phrase. It appears only in independent claim 1 and in some of the unasserted claims. Claim 1 provides no other structural or functional information about it, so we are left to the bare conclusion that it is something in the system that times interrupts to the system. However, at least one clue to its structure is found in dependent claim 5, which adds to the method of claim 1 the additional "step of reprogramming the system interrupt timer to interrupt faster than normal." Thus we know that the timer is something that may be programmable.

Defendants base their argument largely upon the fact that the '414 specification speaks in terms of the system clock interrupting the CPU on a regular basis (DB 13). This is one of the functions of a system clock in any microprocessor-based computer system. As the '414 specification teaches:

> As an example, in IBM Personal Computers and compatibles, the system clock 12 interrupts the CPU 1018.6 times per second (roughly once every 54 milliseconds). This interrupt is used to determine such things as diskette drive motor start and stop time. There are also a host of other time-dependent operations in the computer system that require this granularity of timing. (C7L1-7)

But claim 1 says nothing about *what* the timer interrupts, or *how* it does it or *when*. So it would not, in the view of the SM, be permissible to limit the "interrupt" function to "interrupting the CPU," even though it may well do that, and at "specified intervals."

Nor is it appropriate to limit the "system interrupt timer" strictly to a "device," as Defendants contend. As Plaintiff correctly points out, "like the FDC and CPU, the 'system interrupt timer' is logic that may be a physical, logical or virtual element implemented in hardware, software or a combination of both" (PB 24). But the only example of such an element that is clearly disclosed in the '414 patent is the system clock 12, which is said to be programmable to interrupt "faster than normal" (C7L27) or "normally" (C7L35). **Thus, the "system interrupt timer" of claim 1 should be construed to mean a system clock (as defined below in the element (28) discussion) such as the one disclosed in the '414 patent, which can be programmed to generate interrupts more frequently than normal.** The SM does not believe that this recommendation, if followed, would amount to impermissibly reading the "system clock" limitation into the claim from the '414 specification, because (as will be seen in the discussion of element (28) below) "system clock" has a broader meaning than that.

(25) **floppy diskette ('414 patent)**

See Part A, above.

(26) **defective floppy diskette controller (FDC) ('002 and '222 patents)**

This term in employed in the preambles of independent claims 1 of the '002 and '222 patents. But the question of whether it constitutes a claim limitation *vel non* by virtue of its

appearance in the preambles is moot, because it also appears in the body of the claims: "effective to identify the floppy diskette controller as defective."[80]

Defendants contend that a "defective FDC" is a "hardware device that does not detect a data transfer error caused by a delay in the transfer of the last byte of a sector and that interfaces the computer's CPU with the floppy diskette drive for controlling transfer of data to and from a floppy diskette" (JS Ex. B at 22). Plaintiff says it is simply a "floppy diskette controller (FDC) [that is] not functioning properly" (JS Ex. A2 at 1).

Defendants' proposal is an egregious example of improperly reading limitations from the specification into the claim. We have already determined the meaning of "floppy diskette controller" in Part A above. Defendants provide no valid reason for further encumbering the definition of a "defective" FDC by specifying *what the defect is* (inability or failure to "detect a data transfer error caused by a delay in the transfer of the last byte of a sector"), *how the FDC is hooked up* ("interfaces the computer's CPU with the floppy diskette drive"), *what the function of the FDC is* ("controlling transfer of data to and from a floppy diskette") or, for that matter, specifying that the FDC is "hardware" rather than software or some combination of the two.[81]

The Federal Circuit has expressly rejected the contention that if a patent describes only a single embodiment, the claims of the patent must be construed as being limited to that embodiment. Even when the specification describes only a single embodiment, the claims of the patent will not be read restrictively unless the patentee has demonstrated a clear intention to limit the claim scope using "words or expressions of manifest exclusion or restriction."[82] The

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[80] Actually, the body of claim 1 of the '222 patent uses only the term "floppy diskette controller" and not the modifier "defective." However, the FDC recited in the body of the claim can only be referring to the *defective* FDC called out in the preamble.
[81] See text accompanying note 68.
[82] *Liebel-Flarsheim Co. v. Medrad Inc.,* 358 F.3d 898, 69 USPQ2d 1801, 1807 (Fed. Cir. 2004).

Defendants have pointed to no such expressions and the SM has found none. To adopt their proposed construction here would turn this rule of law on its ear.

Acceptance of Defendants' argument that the defect in the FDC must relate to an inability or failure to detect an error caused by "a delay in the transfer of the last byte of a sector" would also violate the doctrine of claim differentiation, which creates a presumption that each claim in a patent has a different scope. Thus, a claim interpretation that would result in one claim having the same scope as another claim is presumptively unreasonable.[83] In the '002 patent, claim 4 (for example) is ultimately dependent upon claim 1, through dependence upon claims 2 and 3. But claim 4 adds this language: "wherein the underrun error comprises a delay in transferring a last byte in the transfer." Consequently, if one were to import into claim 1 the "last byte" limitation, it would be present as well in dependent claims 2 and 3, and *dependent claim 4 would have the same scope as claim 3.* The same correspondence holds true for claims 1, 3, 4, and 5 of the '222 patent; importation of that limitation into claim 1 would result in claim 5 having the same scope as claim 4. This means Defendants' sought-for construction is presumptively unreasonable, and the SM has seen nothing to disturb that presumption.

Plaintiff, once again, could apparently not resist the temptation to indulge its penchant for elegant variation; it says "defective" means "not functioning properly."[84] That it does, and many other things as well, but none of those variants add anything to the dual inquiry of patent infringement and validity, which after all is what claim construction is intended to facilitate. A jury will have no difficulty understanding what is meant by "defective."

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[83] See *Beachcombers v. Wildewood Creative Prods., Inc.,* 31 F.3d 1154, 31 USPQ2d 1653, 1659 (Fed. Cir. 1994).

[84] As the court said in *Burlington Indus. Inc. v. Dayco Corp.,* 849 F.2d 1418, 7 USPQ2d 1158, 1160-61 (Fed. Cir. 1988), "[b]esides arabic script, we all learn in school a penchant for 'elegant variation,' i.e., a reluctance to repeat even a single word more than once in a paragraph. If San Francisco is named once, on the next reference it becomes 'the Pacific Coast port above mentioned,' or even more elegantly, 'the City on the Golden Gate.' This is how we learn to write. . . . A patent, like any other legal document, is likely to have its intentions defeated by 'elegant variation,' which should be reserved for less mundane documents."

This term needs no construction, for its ordinary meaning is clear.

(27) **processor executing detection executables effective to determine an underrun error undetected by a floppy diskette controller ('002 and '222 patents)**

This term is employed in independent claims 1 of both the '002 and '222 patents. Defendants urge that it is a "processor not part of the FDC executing an application program to cause and detect if an underrun error undetected by a floppy diskette controller has occurred" (JS Ex. B at 26). Plaintiff says it is a "functional unit that interprets and/or executes instructions ascertaining an inadequate data rate not discovered during transfer" (JS Ex. A2 at 19). Again, Plaintiff's penchant for elegant variation comes to the fore, and again it is not helpful.

We have already hashed out Defendants' contention that certain elements and modules must be "outside the FDC" and have concluded that the term "processor" is not so limited, nor is it limited to a "CPU" (see Part B above). Defendants' "cause and detect" interpretation for "determine" is discussed below in connection with elements (31) and (32).

It is possible that the word "executable" might cause some puzzlement to jurors, especially used as a noun as it is in the claims. Although the SM has no doubt that those of skill in the art would immediately understand its meaning as used in these patents, some construction does seem necessary. *Wikipedia* tells us that "[i]n computing, an **executable** (file) causes a computer to perform indicated tasks according to encoded instructions."[85] This accords well with definitions found in various online technical dictionaries and encyclopedias, e.g.:

- A binary file containing a program in machine language which is ready to be executed (run). (Available at http://foldoc.org/?executable)

- An executable is a file that contains a program - that is, a particular kind of file that is capable of being executed or run as a program in the computer. (Available at http://searchcio-midmarket.techtarget.com/sDefinition/0,,sid183_gci212086,00.html)

[85] Available at http://en.wikipedia.org/wiki/Executable.

- **able to run as a program:** describes a computer file, often carrying the extension .exe, that can be run as a program. (Available at http://encarta.msn.com/encnet/features/dictionary/DictionaryResults.aspx?refid=1861609690)

These definitions of "executable" also accord fairly well with Defendants' suggestion of an "application program," but it strikes the SM they it would be a mistake to burden the jury with the possibility that "application" is different from "program" and that both are different from "application program." Why not simply "software" in the broadest sense of the term?

Accordingly, it is recommended that this clause be construed as follows: The term "processor" means an element capable of controlling the interpretation of instructions and their execution; **this element need not be the CPU nor need it be outside the FDC. The term "executables" means software that can run on the processor. The term "software" is used in its broadest sense, and includes high-level applications, portions or "modules" of programs, and so-called "firmware"[86] (instructions or data that are embedded in a particular hardware device).**

(28) **system clock ('002 and '222 patents)**

Independent claims 1 and 15 of the '002 patent and independent claim 1 of the '222 patent call for "a system clock operably connected to the processor to provide a time base." Defendants wish to define this as a "timer that interrupts the CPU at a regular rate" (JS Ex. B at 24),[87] while Plaintiff says it is a "reference source of timing information" (JS Ex. A2 at 11). Defendants base their argument upon the fact that most of the discussion of a system clock in these patents is in the context of providing interrupts to the CPU (DB 20). Plaintiff cites Federal Standard 1037C for its proposed definition (PB 31 & Ex. G), although that extrinsic source also

[86] See note 89.
[87] Compare this to Defendants' proposed definition of a "system interrupt timer" as a "timing device that generates interrupts to the CPU at specified intervals" (JS Ex. B at 8). The SM is hard put to see the difference.

contains a definition that, in the view of the SM, more specifically and precisely defines "system clock" in the context of the present technology: "a device that generates periodic, accurately spaced signals, used for such purposes as timing, regulation of the operations of a processor, or generation of interrupts."

Any modern digital computer system – indeed, virtually any synchronous electronic circuit – requires a system clock to provide the precisely spaced electrical signals that enable the CPU or other processor to do its lockstep work of fetching, decoding, and executing software instructions. Obviously a system clock is not limited only to providing interrupts; the claim language itself gives the lie to that proposal, for it expressly requires that the system clock be "operably connected to the processor to provide a time base." Nor is it limited strictly to a "device" as Standard 1037C would have it.[88]

In the end, "time base" sounds very like Plaintiff's proposed definition of a "reference source of timing information." Yet the SM is troubled, as has been expressed so many times in this report, by taking one set of plain English words in the claim and replacing it with another set, no more and sometimes less informative. For that reason, Plaintiff's proposal will not be recommended here, either. Nonetheless, the familiar word "clock" may have the potential to engender some confusion in the mind of a reasonable juror. **The SM accordingly recommends that "system clock operably connected to the processor to provide a time base" be construed to mean an element, made of up hardware, software, or some combination of the two,[89] that provides electrical signals at a precise frequency to the processor.**

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[88] See discussion accompanying note 68.

[89] Here, and throughout this report, the SM is not excluding so-called "firmware." The *Wikipedia* definition is as good as any: "As its name suggests, firmware is somewhere between hardware and software. Like software, it is a computer program which is executed by a microprocessor or a microcontroller. But it is also tightly linked to a piece of hardware, and has little meaning outside of it." Available at http://en.wikipedia.org/wiki/Firmware.

(29) **determine on demand ('002 and '222 patents)**

Claim 9 of the '002 patent (and claim 10 of the '222 patent) requires that "the application is effective to determine on demand whether the floppy diskette controller is susceptible to undetected underrun errors." Neither patent uses the term "determine on demand" except in the claims. The "application" referred to is defined in claim 8 (upon which claim 9 depends; claims 9 and 10 respectively for the '222 patent) as an application into which "the detection executables (see discussion of element (31 below) are integrated" and which is "directly loaded and executed on the processor." Defendants offer no construction for this clause; rather, they argue that it is indefinite because it is not defined in the specification of the '002 patent (JS Ex. B at 34). Plaintiff of course disagrees and says to "determine on demand" means to "ascertain upon request" (JS Ex.A2 at 28). The SM is hard put to see how a juror would be more likely to understand Plaintiff's translation than the actual words of the clause.

Defendants' position is simplistic in the extreme:

> The term "on demand" is not a term of art, nor do the specification and prosecution history use or define the term. In its everyday sense, "on demand" implies that someone or something is doing the demanding, and the '002 and '222 patents do not explain or suggest who or what that may be, or what response time or criteria would qualify as "on demand."
>
> Because the intrinsic record is devoid of any reference to the term "on demand" and, consequently, does not inform who or what is doing the demanding and how quickly that step must be performed, this term is "insolubly ambiguous," and, hence, indefinite. (DB 21)

This rhetoric is easily defeated by looking at the entirety of the claim itself, and reading it in light of the specification. The "who or what is doing the demanding" is apparent from the context of the claim, which makes it clear that the demand is being made by the *application* into which "the detection executables are integrated" and which is "directly loaded and executed on the processor." As for the timing, we all know that nothing happens instantaneously, so the

"determine on demand" step must be accomplished in some finite time. Defendants do not explain why it is crucial to put some sort of time reference on this step, but the SM is nonetheless confident that a person of ordinary skill in this art would have no difficulty whatever in understanding that the "determine on demand" step, like every other software-controlled step in these patents, would be performed in a time span that depends on a multitude of factors, such as the speed and computing power of the processor and the complexity of the "application." The SM therefore rejects Defendants' argument that the term is indefinite.

It is recommended that the "determine on demand" step be construed as a step that is controlled by the "application" of claims 8 ('002 patent) and 9 ('222 patent).

(30) **shadowing executable ('002 and '222 patents)**

This term appears in claim 10 of the '002 patent and claim 11 of the '222 patent. Neither patent uses the two-word combination in the specification, but both are replete with references to "shadowing" and "executable." Defendants say this is "software that implements programmatic CPU monitoring of data (byte) transfers and timing the last byte of a sector's DREQ to DACK signals" (JS Ex. B at 34). Plaintiff says it is "[m]onitoring instructions that are interpreted and/or executed" (JS Ex. A2 at 34).\

We have already seen, in connection with element (27), that the term "executable" means a software program that can run on the processor. And, somewhat refreshingly, the parties appear to agree on a synonym for "shadowing" in the context of this invention. They both say that it means, in essence, "monitoring," although Defendants (despite using "monitoring" and not "shadowing" in their proposed definition) quibble with that simple correspondence because they attach extreme importance to *what* is being monitored (DB 20-21). But Defendants' suggestion of what must be "monitored" by the shadowing executable goes far beyond the plain words of

the claim, which call for the executable "to determine when a last byte is to be transferred" from the DMA to the FDC.

According, this limitation should be construed to mean that the detection executables include software that can be run on a processor and that is effective to determine when a last byte is to be transferred from the DMA to the FDC.

(31) **detection executables effective to be run on the processor to force and detect an underrun error not detected by the floppy diskette controller ('002 and '222 patents)**

(32) **processor executing detection executables effective to precipitate and detect an underrun error undetected by a floppy diskette controller ('002 patent)**

Independent claims 11 of the '002 patent and 12 of the '222 patent employ the "force and detect" version of this term. Defendants say this means an "application program executing on a processor not part of the FDC to cause and detect an underrun error not detected by the floppy diskette controller" (JS Ex. B at 37). Plaintiff says it constitutes "[i]dentification instructions that are interpreted and/or executed forcing and discovering an inadequate data rate not discovered during transfer" (JS Ex. A2 at 40). Independent claim 15 of the '002 patent employs the "precipitate and detect version; the word "precipitate" does not appear anywhere else in the patent. Defendants: "processor not part of the FDC executing an application program to cause and detect an underrun error undetected by a floppy diskette controller" (JS Ex. B at 41). Plaintiff: "A functional unit that interprets and/or executes instructions precipitating and discovering an inadequate data rate not discovered during transfer" (JS Ex. A2 at 110).

We have already, in connection with element (27) above, disposed of the parties' contentions regarding the terms "processor" and "executables." But Defendants indicate that there remains an issue as to whether the functional language "to force and detect" means the same thing as the functional language "to determine" in element (27). They raise the same issue

with respect to the functional language "to precipitate and detect" in element (32), discussed below. Defendants argue that these functional terms "have the same essential meaning" (DB 18). Defendants have a point here, or at least a partial one.

During the prosecution of the '002 patent, the applicant interviewed the patent examiner and filed a paper that said in "the interview, it was determined that the prior art does not teach identifying the faulty Floppy Diskette Controller, nor does it teach precipitating (causing) the delay that creates the error." Defendants argue that the inventor thereby informed the public that "precipitate" means "cause" (*Ibid*). And so it does, in anybody's view of the English language, although it usually has a little more subtle meaning, as "to make something happen suddenly or sooner than expected."[90] And that also looks very much like the intended usage of "force" in element (31). The SM accordingly has no difficulty accepting the proposition that "force and detect" and "precipitate and detect" do have the same meaning, which is "cause and detect."

Not so for element (27), however. The plain meaning of "determine" in no way is synonymous with "cause and detect." As indicated in the discussion of element (26), the doctrine of claim differentiation creates a presumption that each claim in a patent has a different scope, and a claim interpretation that would result in one claim having the same scope as another claim is presumptively unreasonable. That presumption was overcome in the case of "force" and "precipitate" because the usage of those words, in conjunction with "detect," is so very similar. But that is untrue for "determine." The word stands alone, unaccompanied by "and detect." And there is nothing about the ordinary meaning of the word "determine" that conjures up the transitive verbs "force" or "precipitate" or, for that matter, "cause."

It is recommended that these clauses be construed as follows: **The term "processor" means an element capable of controlling the interpretation of instructions and their**

[90] See, e.g., http://dictionary.cambridge.org/define.asp?key=62249&dict=CALD.

execution; this element need not be the CPU nor need it be outside the FDC. The term "executables" means a software program that can run on the processor. The function of that software program is to cause and detect an underrun error undetected by an FDC.

(33) **processor operably connected to the storage medium and programmed to execute a signature detection module, the signature detection module being effective to detect improper storage of the bytes ('767 patent)**

This limitation appears in independent claim 1 of the '767 patent. Defendants: "processor not part of the FDC operably connected to the storage medium and programmed to execute an application program able to detect a data pattern specific to a particular form of data corruption" (JS Ex. B at 42). Plaintiff: "A functional unit interpreting and/or executing instructions to discover the improper storage of bytes by an associated functional unit" (JS Ex. A3 at 1). Here again, Plaintiff's offering is not helpful. As Defendants point out, the term "functional unit" is vague and ambiguous (DB 23), as is the conjunctive-disjunctive "and/or."

Defendants' argument that the processor must not be part of the FDC has been dealt with at length elsewhere and is rejected here as well; so too with the word "application." The remaining issue, then, is what is meant by a "signature detection module?" The '767 specification does not use the word "module"; it appears only in the claims. However, the specification uses the term "signature detection executable" consistently throughout in the same context, and we have already seen that, in the context of these patents, the word "executable" means a software program that can be run on a processor (see discussion of elements (31) and (32) immediately above).

The specification uses "signature" often; the following passages shed light on its meaning:

- The defect in FDCs, however, results in various types of corruption having different signatures, according to the nature of the defective FDC and the nature of the conditions at transfer. (C4L4-7)

- [I]n accordance with the invention as embodied and broadly described herein, a system and method are disclosed in one embodiment of the present invention as including a detection program that is capable of correctly and accurately detecting the signature of data corruption associated with defective FDCs. (C4L46-52)

- A signature detection executable 60 may contain instructions in suitable code for implementing algorithms. (C6L58-59)

From this it is clear that the inventor was using "signature" as something that reflects kind or type. Here, the reflection is, in the words of the specification, the type of data corruption. But Defendants insist that the signature detection executable must be "able to detect a data pattern specific to a particular form of data corruption." First off, insertion of the term "data pattern" would add uncertainty, just as Plaintiff's suggestion of "functional unit." Moreover, to employ that limitation would be to ignore the expressly defined function of this limitation in claim 1, which is "to detect improper storage of the bytes."

Accordingly, this limitation should be construed to mean a processor (as that term has been defined elsewhere in this report) that is programmed with software that, when executed, can detect improper storage of bytes in the storage medium.

(34) **demarcation rule ('767 patent)**

Defendants contend that this term is indefinite (JS Ex. B at 46). Plaintiff disagrees, and says it means "A rule defining a logical point of separation" (JS Ex. A3 at 6). Defendants correctly point out that the term "has no plain or ordinary meaning in the art, and Plaintiff has identified no evidence of such a meaning. The specification does not even use, let alone define, this term, nor does the prosecution history." (DB 23) The term, which appears in the second step of asserted claim 12 of the '767 patent is nothing more than a coined "placeholder" phrase

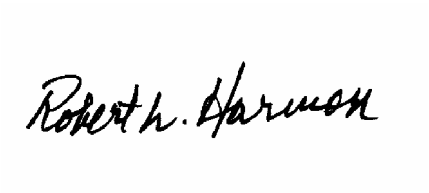
intended to serve as shorthand for further use in the third step ("scanning the data bytes in accordance with the demarcation rule'). What the term is shorthand *for*, of course, is the immediately following functional language of the second step: "effective to reflect a correspondence of data bytes to the sector size of the storage medium and effective to identify a first byte, a last byte, and a next-to-last byte corresponding to the sector size." In other words, practice of the method of claim 12 requires identifying a rule (step two) that is effective to achieve those functions, and then scanning the data bytes in accordance with that rule (step three). The word "demarcation" has no magic here; the inventor could as well have called it a "computational rule" or a host of other equally innocuous names.

Defendants bootstrap their observation that the specification does not define the term into an argument that claim 12 is indefinite. Their argument goes like this: Because the specification describes no "rule" for reflecting a correspondence of data bytes to the sector size of the storage medium and identifying a first byte, a last byte, and a next-to-last byte corresponding to the sector size, a person of ordinary skill in the art would not understand the metes and bounds of the claim and it is therefore indefinite. (DB 24) Now perhaps Defendants may have some arrows in their quiver in this respect, but they most certainly do not include an "indefiniteness" broadhead. Perhaps Defendants may be able to establish, by clear and convincing evidence, that claim 12 is invalid because the specification does not *enable* one of skill to "determine" such a rule. Or perhaps they may be able to persuade the Court or a jury, with clear and convincing evidence, that the specification does not *support* the claimed rule. But they most assuredly will be unable to show, by clear and convincing evidence, that one of skill in this art would not understand that the term "demarcation rule" means a rule for reflecting a correspondence and identifying bytes, as expressly recited in the claim.

Plaintiff's proffered definition, "a rule defining a logical separation," merely complicates matters. Indeed, it is misleading. A demarcation rule is a rule that is, according to the claim, "effective to reflect a correspondence of data bytes to the sector size of the storage medium and effective to identify a first byte, a last byte, and a next-to-last byte corresponding to the sector size." No judge or jury should have to be concerned with whether a rule meeting those criteria also defines "a logical separation," whatever *that* may be.

Accordingly, it is recommended that "demarcation rule" be construed to mean, just as claim 12 of the '767 patent requires, a rule "effective to reflect a correspondence of data bytes to the sector size of the storage medium and effective to identify a first byte, a last byte, and a next-to-last byte corresponding to the sector size."

Respectfully submitted,



Robert L. Harmon

Special Master